Operating Manual Silomanager SM2010S

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Inhaltsverzeichnis

⚠	**Please read this manual carefully. Misentries may cause incorrect results or malfunctioning.**	☞

☞	**Explanations of the abbreviations used can be found in Appendix A (at the end of this document).**

1. Overview scheme
1.1. Schematic diagram hardware structure

Control room   Cell floor

SM2010S

PC

Remote power supply ASFII

230V

Option Alarm module

Alarm module

230V

zone free

Scanbox ADT-D

Scanbox ADT-F

Scanbox ADSB
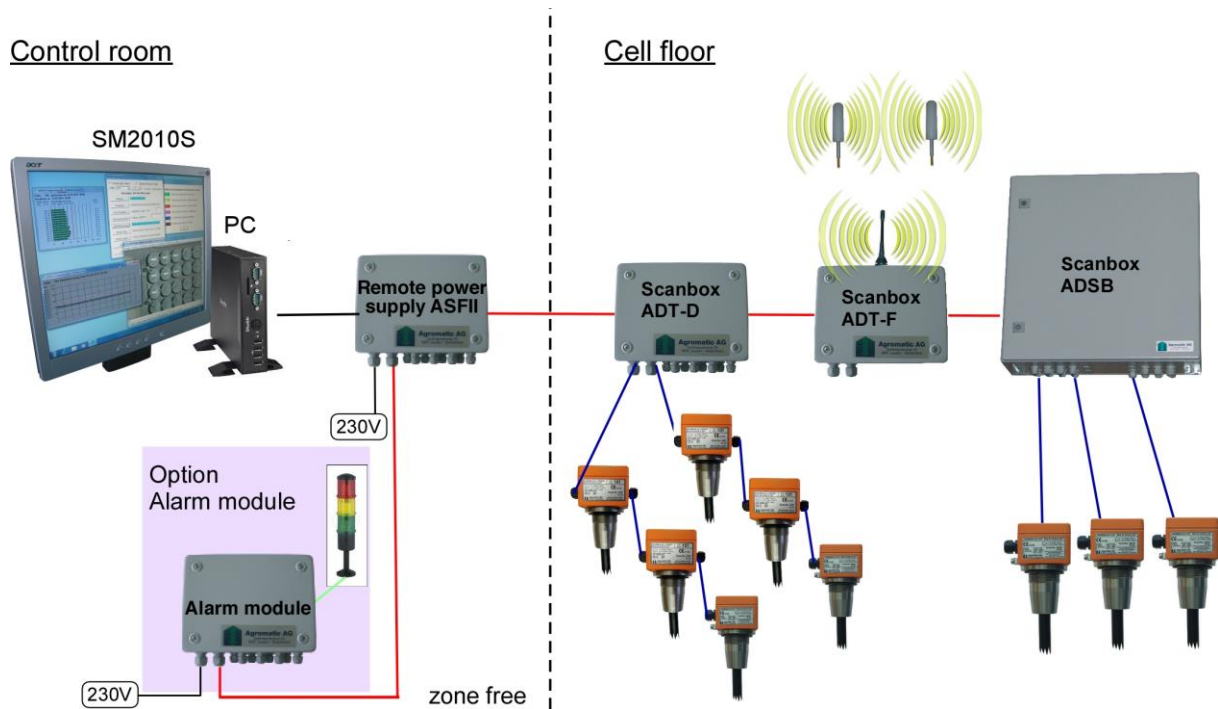
1.2. Detail scheme

Control room

ADT data bus

Remote power supply ASFII

230V

SM2010S

USB 2.0

LAN

RS232

USB

Option: Printer

Option: data remote access

Option: Network printer
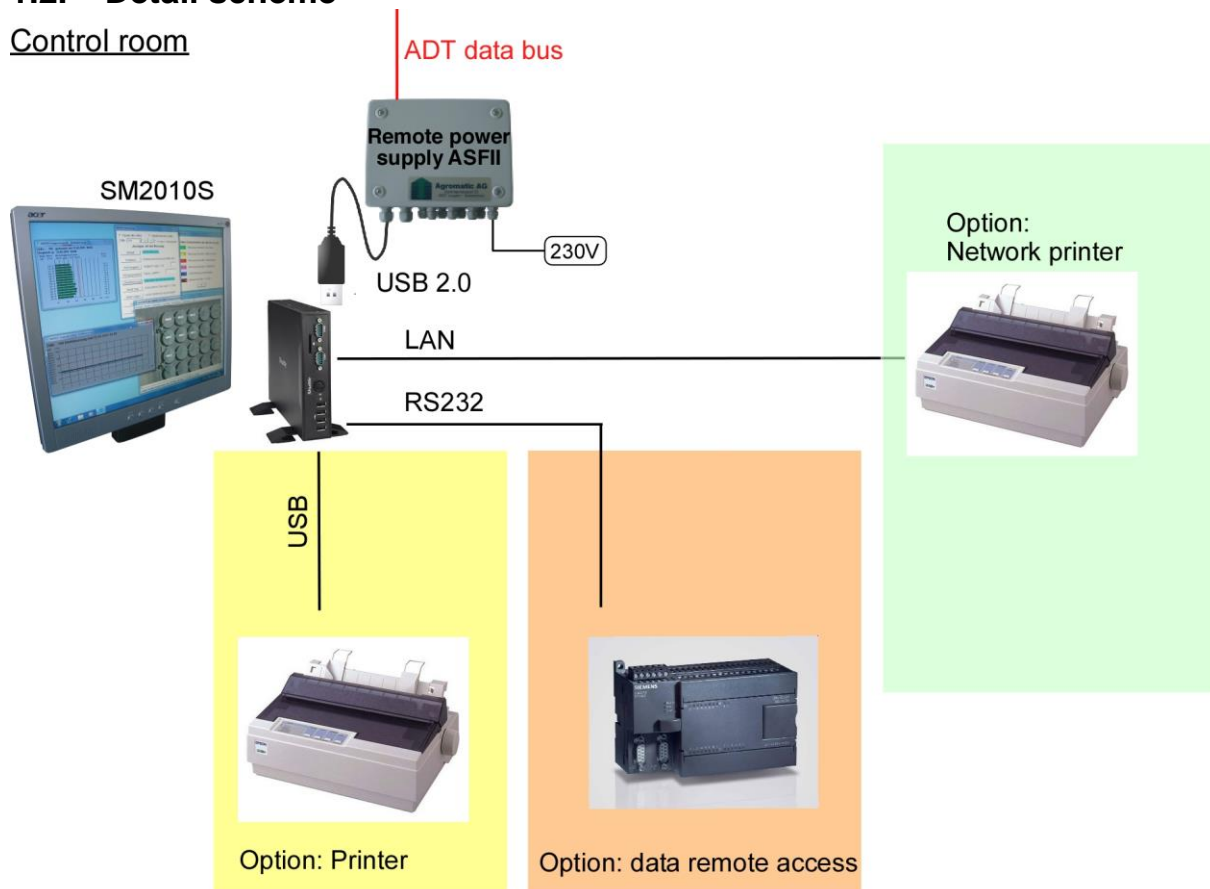
2. Installation and starting system

2.1. Delivery with PC

If the evaluation PC is part of the order and included in the scope of delivery, the software SM2010S is already installed and tested. In this case point 2.2. can be skipped.

2.2. Delivery without PC

If the PC is not included in the scope of delivery, the corresponding software is supplied on a USB stick and must be installed by the customer himself.

Minimum requirements for PC:
Processor: min. 1.5 GHz
RAM: 4 GB
Architecture: 32/64 Bit
Port: min. 1 x USB 2.0, Option: RS232 (COM1), Ethernet 100 Mb/s
Harddisk: 60 GB
Operating system: Win7 or Win10
Printer: A printer must be installed (may as well be a PDF printer).

The following procedure must be followed for the software installation:

2.2.1. Copy data

1. Start up the PC.
2. Connect the USB-Stick. Wait until it has been recognized by the system.
3. Change to the directory of the USB stick.
4. Copy the whole folder "Agromatic-SM2010S" directly to the system drive, normally it is the drive C:\.

2.2.2. Creating shortcuts
2.2.2.1. On the desktop

1. Switch to directory "C:\Agromatic-SM2010S".
2. Right-click on the file "SM2010S.exe" and create a shortcut in this folder.
3. Copy this shortcut to the desktop.

2.2.2.2. In the autostart folder

4. Click the same shortcut with the right mouse button and copy it.
5. Press the keys Window+R: Enter 'shell:startup' in the window "Run" and execute.
6. Open the Explorer, insert the link into the Autostart folder with the right mouse button.

2.2.3. Switching off the energy-saving mode

Win7:	Go to: Start/System/Energy Options/Energy Save Mode change → Set Energy Save Mode to NEVER
Win10:	Start/Settings/System/Mains Operation and Save Energy Change → Set Standby mode to NEVER.

2.2.4. Bios

	To ensure recording runs smoothly, computer should be permanently in operation (i.e. 24h). On power failure, automatic reboot is absolutely essential. Settings must be done in the bios of the PC.

2.2.5. Installing additional programs
2.2.5.1. Installing the PDF-Creator

- Change to folder C:\Agromatic-SM2010S\PDF-Creator.
- Perform installation. Click on "agro_pdf24.exe".
- Perform installation by default. The language setting is adopted by the system. Confirm everything by Default.
- Click [Next] when prompted for a license. The program will be installed nevertheless.

	Important: The proposed printer name must not be changed.

After the successful installation, a new printer should be listed on Windows device manager, called: PDF24 PDF.

- Start program PDF24 from the Windows program list.
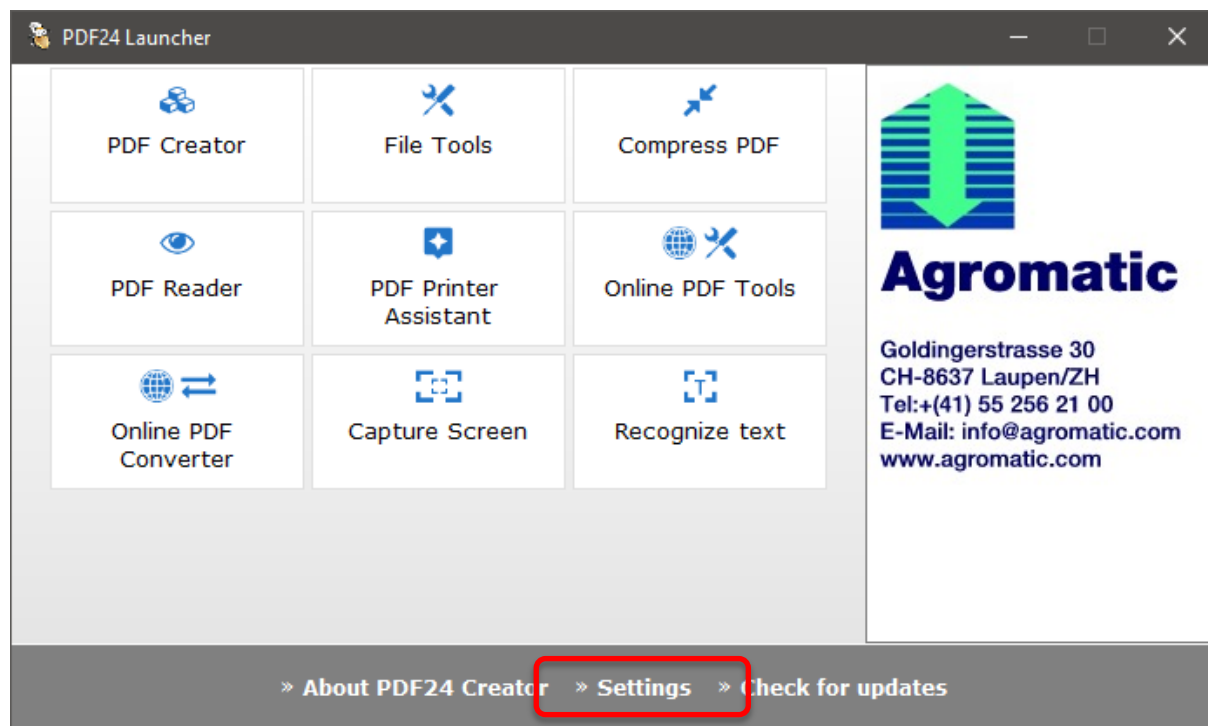
- Click on «Settings».

- Select menu "PDF Printer".
- Select "run as administrator".
- Confirm "Allow changes".
- Select "PDF Printer" again.
- Make the settings as marked red below in the submenu "PDF Printer".
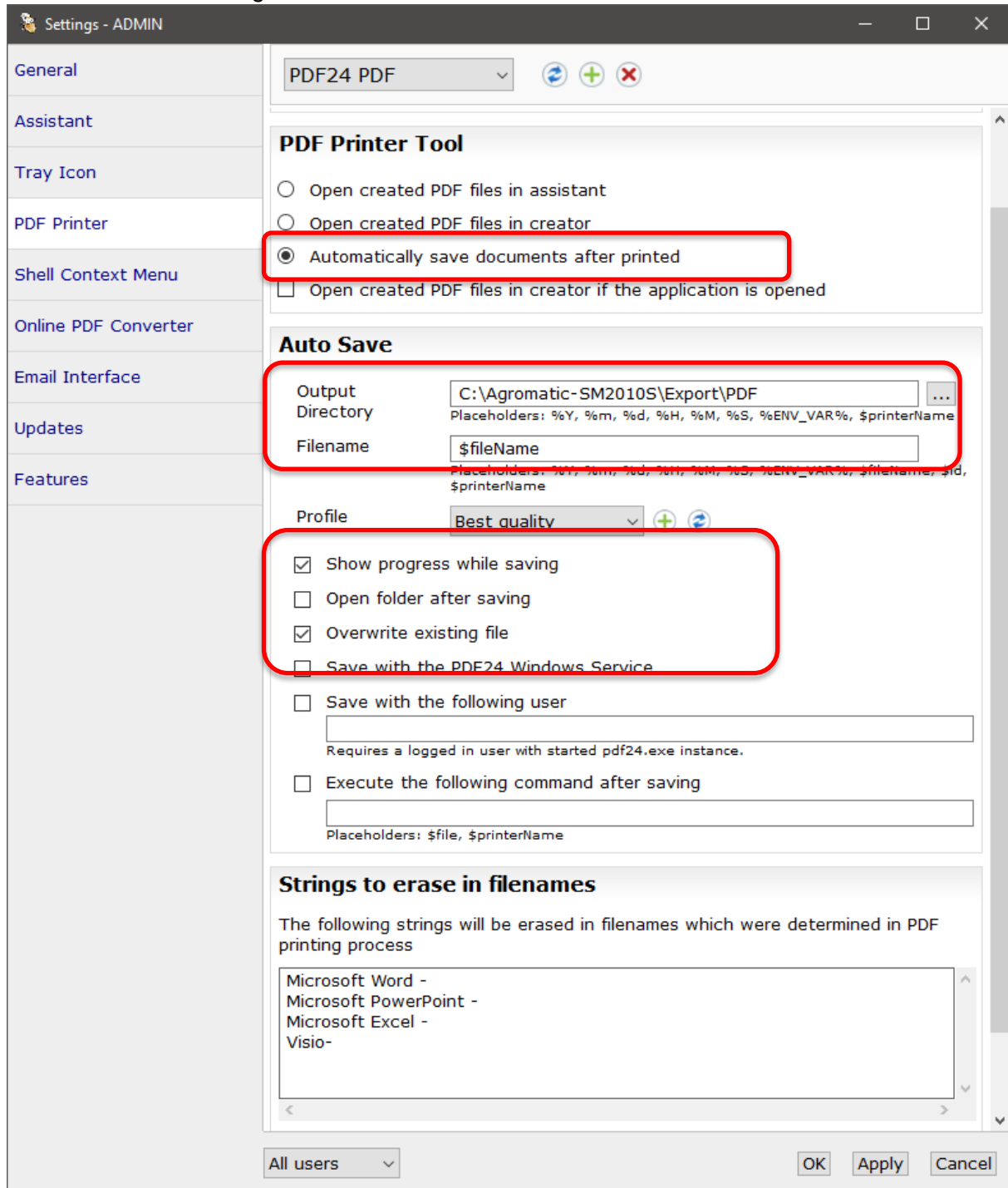
- Save definitions with **[Apply]**.

- Select menu "Updates".
- Select "run as administrator".
- Confirm "Allow changes".

- Select "Updates" again.
- Set the update mode to "Disable checking and installing updates".
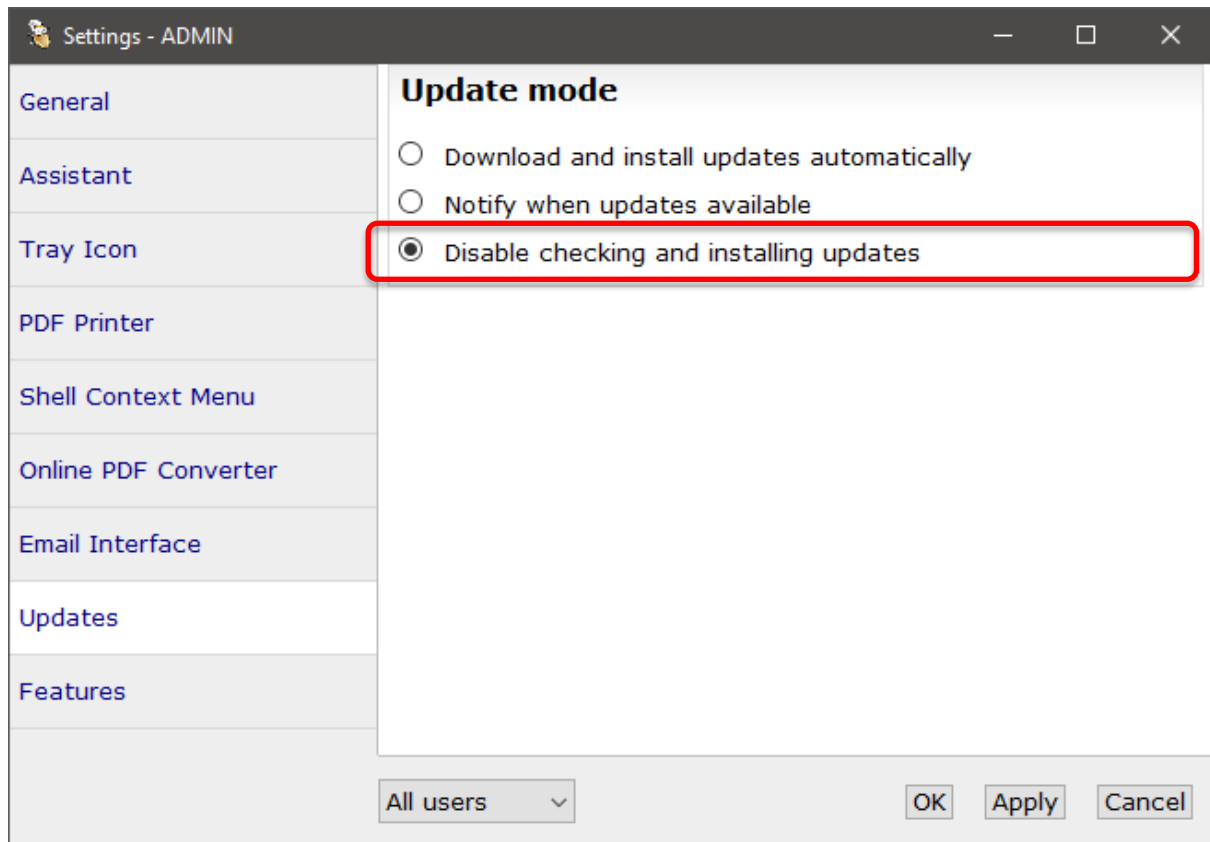
- Exit the dialog with **[Apply]** and **[OK]**.

2.2.5.2. Installing the PDF-Viewer

1. Change to the folder C:\Agromatic-SM2010S\PDF-Viewer.
2. Perform the installation. Click on "pdf_xchange_viewer.exe".
3. Execute the installation.
   - Select language   → Next
   - Accept the agreement   → Next
   - Full installation   → Next
   - Menu Folder – Standard   → Next
   - Free Version   → Next
   - Ready to install   → Install

The Viewer will be installed.

4. Configuring the PDF Viewer

   - From Program List Tracker Software - Open Tracker Updater
   - Menu Settings - General, "Install automatically after download" → uncheck
   - Menu - Settings, start automatically → never.

5. Close program.

6.   Define PDF viewer as default via "Open with".
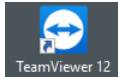
If you want to define your own program for a certain file type, you can do it via the context menu for this file. Example of a PDF file:

- Right click on the file → Open with
- Select another app
- More Apps
- Scroll down until "Find other app on this PC" appears and click
- Now you have to search and select the EXE file for the program. For "PDF-Viewer" this should be in the folder

  "C:\Program Files\Tracker Software\PDF Viewer\PDFXCview.exe"

  Then check the box at "Always use this app to open ... files".

2.2.5.3.   Installing the Service-Tool TeamViewer

1.   Change to the folder C:\Agromatic-SM2010S\Teamviewer.
2.   Perform the installation. Click on "TeamViewer12_Setup.exe" (version number can change).
     Perform the installation by default.
3.   Confirm everything with Default.
4.   After successful installation a new icon should appear on the desktop.

⚠	**Before commissioning the entire temperature measuring system, Agromatic must be contacted to allow the software licence to be issued. (Hardware lock with AFS).**	☞

2.3. Commissioning

☞	Explanations of the abbreviations used can be found in **Appendix A** (at the end of this document).

2.3.1. Read in of digital sensors

Requirement:
- The complete temperature monitoring system must be connected according to the wiring diagram (bin plan) or schematic diagram.
- ADT-D scanboxes jumper must be open prior to proceed a read in. (cold start, see also BAA Scanbox ADT-D)
- Set terminating resistors correctly on first module of the data bus, usually a remote supply (AFS), and on the last module, which can be an analogue scanbox (ADSB), a digital one (ADT-D) or a wireless transmitter (ADT-F), → see also chapter Address-Plan (Address sorting).

Procedure:

1. Switch on power supply of complete temperature system.
2. Wait approx. 15 minutes. Meanwhile the ADT-D scanboxes will read in all connected digital temperature measuring cables.
3. Start the SM2010S (click shortcut on desktop)
4. Perform function: Menu → Maintenance →Enter password → 863704 → Configure digital bins

⚠	Wrong handling and adjustments in this menu may cause wrong measurements and total breakdown of the complete system!
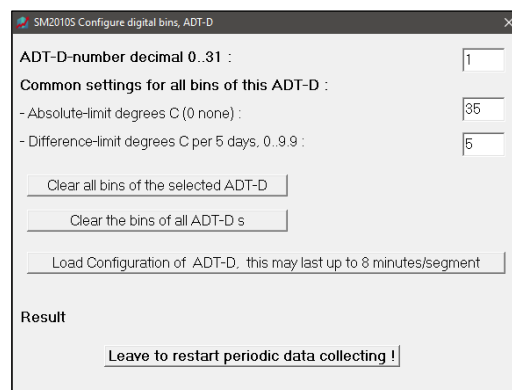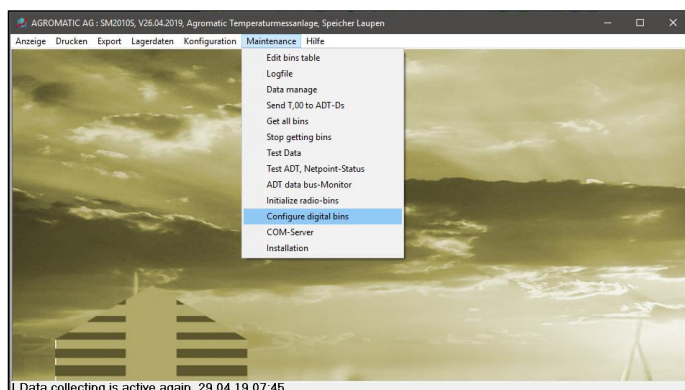
5. Insert ADT-D number   e.g. '1'
6. Set absolute limit   → Standard '35'
7. Set difference limit   → Standard '5'
8. Press button **[Clear all bins of the selected ADT-D].**
9. Press button **[Load configuration of ADT-D, this may last up to 8 minutes/segment].**

10. Wait until result is displayed: «All bins of ADT-D 1 configured». This may take up to twelve minutes.
11. If several ADT-D have to be imported restart at point 5.
12. Press button **[Leave to restart periodic data collecting!]**.
    The window is closing and the system goes online again.
    After approximately 2 hours the first measured values are available and can be queried. This process can be accelerated by initiating a quick measurement. See chapter **5.6.5. Get all bins**.
13. Sort bin names. After importing all bins can be sorted in ascending order.

    Perform function: Menu → Maintenance → Edit bins table
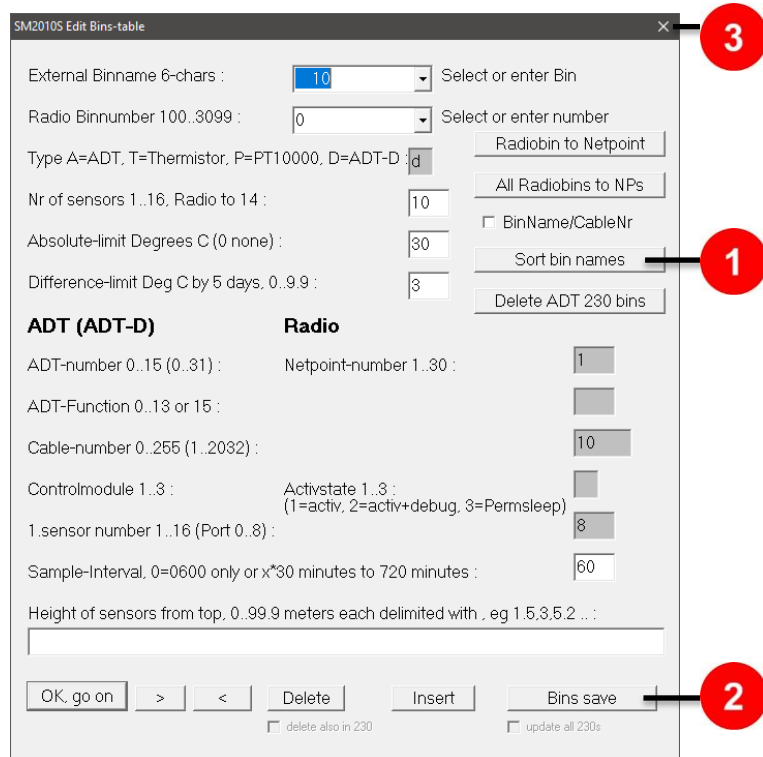
1: Press button **[Sort bin names].**
2: Press button **[Bin save]**.
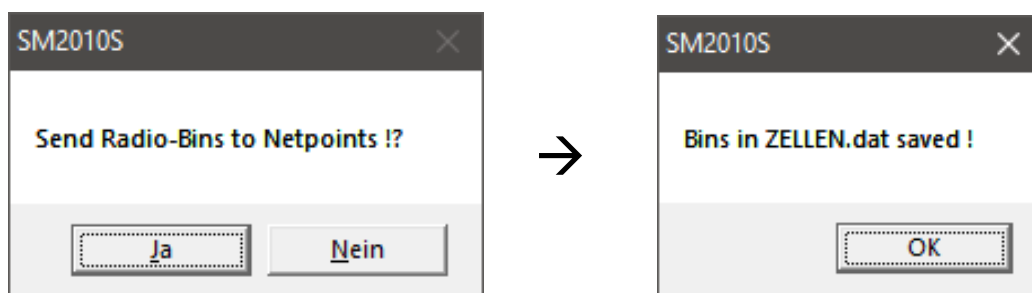
   If no wireless probes are used → **[NO]** otherwise → **[Yes]**
   The sorted list is memorized→ **[OK]**.

3: Close menu Edit Bins Table → **[X]**

14. Once all temperature measuring cables have been read in correctly, jumpers on the ADT-D scanboxes must be set (warm start).

2.3.2. Read-in analogue temperature sensors

Skip this chapter if the temperature monitoring system does not contain analogue scanboxes (ADSB).
If analogue scanboxes are connected, temperature sensors are preconfigured ex works. If additional analogue sensors are supplied, the configuration must be carried out by Agromatic. This could be done via TeamViewer. The temperature sensors must be connected according to the supplied wiring diagram.

2.3.3. Read-in wireless probes

Skip this chapter if the temperature monitoring system does not include wireless probes.
In the other case see point **5.6.10 Initialize radio bins** for detailed description.

2.3.4. Change background picture

The background picture in the main window can be changed individually. The Agromatic standard picture is displayed on delivery. It may be replaced by a bird's eye view of the silo plant.
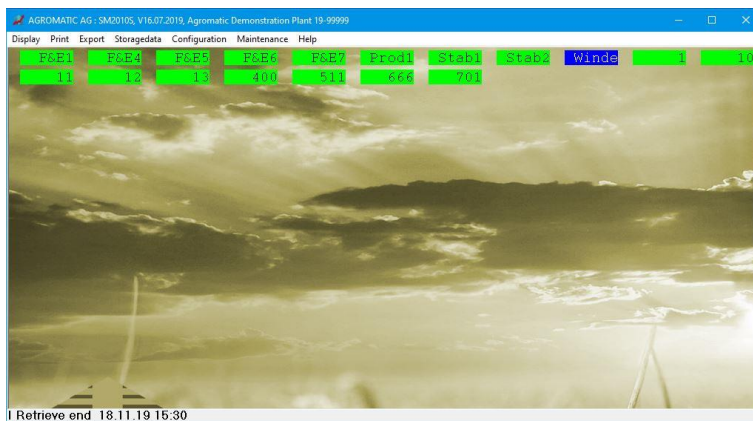
The default SM2010S user interface looks like the one shown on the left. The bins found are displayed at the top of the screen. Their position cannot be changed!

2.3.5.   Change position of bin numbers

In the image below the background picture has been changed. A silo plan shows where the different temperature measuring cables are positioned. The bin names of the temperature measuring cables can then be positioned at the respective location in the image. See also **5.5.1. General Configuration.**
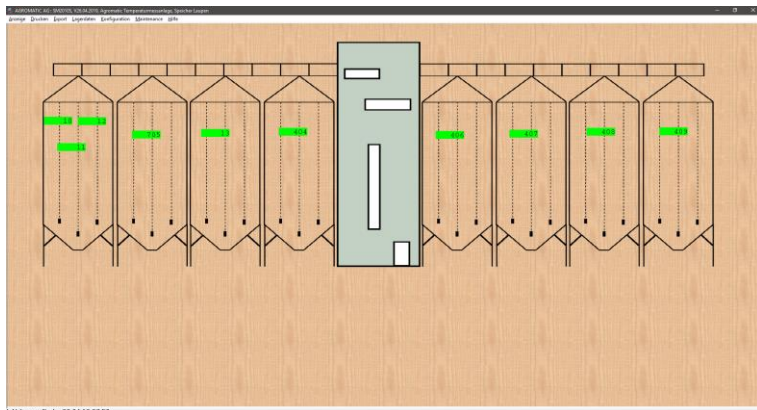
An own background picture must have the size of minimum 1000 x 674, maximum 1920 x 1080 pixels.
The image format is Bitmap (*.bmp).
The positions of the bin names can be changed!

☞	The positioning of the bin names is only possible if the name of the picture is **not** *Default.bmp.*

☞	If several measuring cables exist in the same bin, it makes sense to combine them as a group. Creating groups is described in detail in chapter **5.5.6 Configure groups**.

2.3.6.   Data backup

Data backup is the responsibility of the customer.

☞	Agromatic recommends to copy the whole folder C:\ Agromatic-SM2010S to a backup drive at regular intervals.

As an option Agromatic offers a data backup. See chapter **6.5 Data backup**.

3. Functioning

3.1. General

The Silomanager SM2010S is the further development of the SM2010N and is a Windows based software package. The silo temperatures are monitored with the Silomanager. Depending on the software version, up to 1200 bins with max. 16 sensors each can be displayed.
The temperature data are stored and can be displayed again at any time. Printing measuring records, temperature curves or storage data is also possible.
Analogue scanboxes (ADSB) as well as digital scanboxes (ADT-D) and wireless receivers (ADT-F) can be evaluated with the SM2010S. Even older relay-based systems (AFT-R) are supported.

The measured data (temperatures) are continuously recorded via the ADT data bus and stored on the computer. The measured values can be displayed on the monitor or printed out via an external printer. The measurements can be compared with any set limit values or with previously recorded values.

The window «SM2010S Help» displays incorrect measurements and alarms. Optionally, an alarm module (AAM) can be installed in the temperature measuring system. This makes it possible to indicate faults optically or acoustically or to forward them to a control system.
Critical temperature developments are detected at an early stage and necessary measures to maintain the quality of the stored products can be taken in good time. The Silomanager SM2010S can identify hazards. See also chapter **6.4 Alarm module**.

The Silomanager can also be used to record, define and display storage data. Administration takes place in the «Stock data» menu. Various details about a stored product can be recorded, to provide information about the quality, quantity, supplier, etc. of the stored products.

3.1.1. Coloured representation of the states

On the main screen and on various other possible displays many different colours are used to represent the possible states of all measuring cables and measuring points. In SM2010S this display has been slightly changed and extended for a better overview. The colour table is stored in **Appendix B**.

3.2. Time of reference measurement

The time of the reference measurement is determined in such a way that very little external influences are possible preventing temperature measurings from solar radiation and daily temperature differences. The time of the reference measurement is fixed at 0600 a.m. and cannot be changed.

3.3. Time of actual measurement

Half-hourly measurements are possible and can be set between 30 minutes and 720 minutes. If the value is set to ZERO, only the reference measurement will be made. On delivery, the measuring cycle is adapted to 120 minutes for wired probes and 60 minutes for radio probes.

4.   Operation

View temperature values

Click on bin number in main window.
If the bin name is a group, the group view is displayed first.
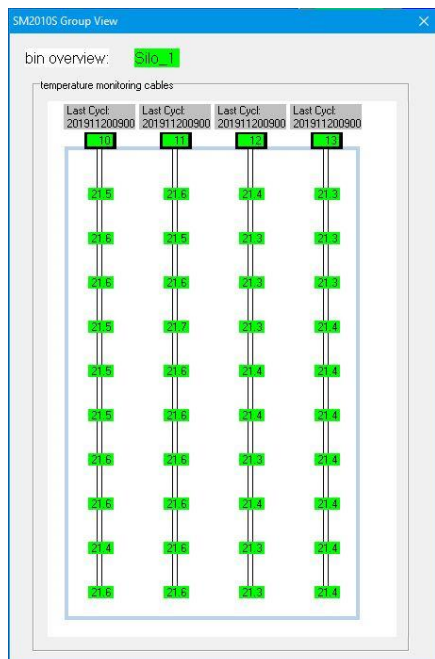
In this case, click on the relevant measuring cable in the group view.

Two new windows appear. One is showing the current temperature profile of the selected measuring cable, the other shows the temperature course of the last 30 days.

Picture: Temperature profile
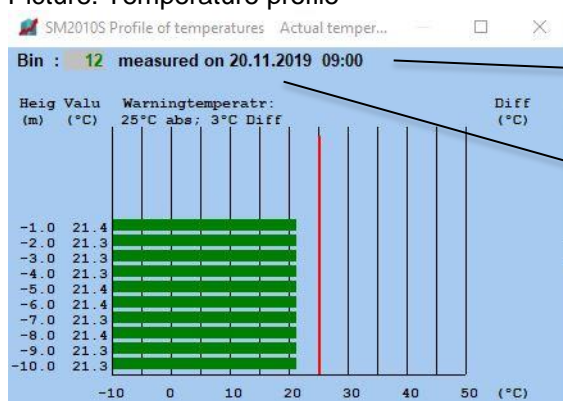
Selected bin, day and time of last measurement

For comparison measurements, the start date and time are specified here.

Description of temperature profile

The two columns on the left height(m) and value(°C), are showing the positions of the sensors in the measuring cable and the corresponding temperature value and chart (green line).
The red marking shows the set absolute alarm limit.
Set alarm values are displayed above the chart. (Warning temperatures here: 25°C (absolute); 3°C (difference). For comparative measurements, the right column Diff(°C) shows the difference between two temperatures.

Picture: Temperature course
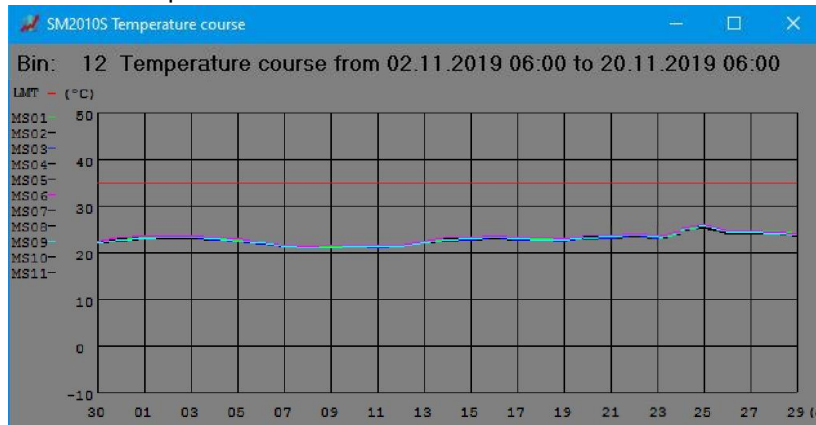
Description of temperature course

The temperature course is always displayed over one month. Only the reference measurements at 6:00 a.m. are taken into consideration. Once enough data are available, the chart looks similar to the sample above.
The banner of this part indicates: actual bin, start date, time, end date, time.
The temperature is displayed in the Y-axis and the days in the X-axis. The colour table of the individual measuring points can be seen on the left of the graphic.

☞	When querying temperature values via the «Display» menu, it is possible to select single, all or only critical bins. If a single bin is selected, the data is displayed graphically. If «all cells» or «critical cells» are selected, these are displayed in tabular form.

Show reference measurement as table

Perform function: Menu → Display → Checkbox «Table all bins» → press button **[Reference]**

Example of a table: Current measured values for all bins.

DD.MM.YYYY	HH:MM	Bin Nr	MP01	MP02	MP03	MP04	MP05	MP06	MP07	MP08	MP09	MP10	MP11	MP12	MP13	MP14	MP15	MP16
20.11.2019	06:00	F&E1	21.4	21.3	21.3	21.0	21.1	21.1										
20.11.2019	06:00	F&E4	21.2	0.1														
20.11.2019	06:00	F&E5	21.3	0.1														
20.11.2019	06:00	F&E6	21.5															
20.11.2019	06:00	F&E7	23.2	23.1	23.1	23.1	23.1	23.2	23.2	23.2	23.2	23.2	23.3	23.4	23.4	23.4		
20.11.2019	06:00	Prod1	21.3	0.7	21.2	20.9	21.1	20.9	21.2	21.2	21.3	21.3	21.4	21.6	21.5	21.7		
20.11.2019	06:00	Stab1	21.1	20.9	20.6	19.5	20.8											
20.11.2019	06:00	Stab2	21.3	21.0	20.8	19.7	20.8											
20.11.2019	06:00	1	21.3	21.4	21.3	21.3	21.1	21.2	21.2	21.4	21.3	21.2						
20.11.2019	06:00	10	21.6	21.6	21.7	21.6	21.6	21.6	21.7	21.7	21.6	21.7						
20.11.2019	06:00	11	21.7	21.6	21.7	21.8	21.7	21.6	21.6	21.7	21.7	21.7						
20.11.2019	06:00	12	21.5	21.4	21.5	21.4	21.5	21.5	21.6	21.5	21.6	21.5						
20.11.2019	06:00	13	21.4	21.4	21.5	21.5	21.5	21.5	21.5	21.5	21.6	21.6						
20.11.2019	06:00	400	21.1	20.4	20.9	20.4	20.4	21.2	20.7	20.8	21.0	20.7	20.3					
20.11.2019	06:00	511	21.1	21.2	21.3	21.1												
20.11.2019	06:00	666	21.8	22.1	22.1	21.8	22.1	21.7	22.1	21.7	22.0	22.4	22.0	22.1	22.1	22.1	22.2	22.0
20.11.2019	06:00	701	20.7	20.7	21.1													

The appearing window shows the reference measurement of 06.00 a.m., of all temperature measuring cables (bins) and of all sensors with the temperature values.

Show actual temperature values of one single bin

Perform function*:* Menu → Display → select bin → click button **[Actual]**

The appearing window shows the last measurement (time) of all sensors of the selected temperature measuring cable (bin) with temperature values. In addition, the temperature course of the last 30 days is also displayed.

Print all reference measurements

Perform function: Menu → Print → Checkbox «all» → press button **[Reference]**

Today's reference measurements of all bins at 06.00 a.m. are transmitted to the printer.

Direct Measurement

Perform function*:* Menu → Display → select bin → press button **[Directmeasurm]**

The text «bin every minute directly» is coloured blue for this view. The selected bin is taking measures every minute and will display them in a graph. To cancel the function, press button **[Direct Stop]**.

Reference Comparison

Perform function*:* Menu → Display → Choose bin → push button **[Ref-Compare].** Dial a number between 1 to 30 days or enter zero (0) to display the actual reference measurement without comparison measurement is displayed.

Picture 1: Reference Comparison: Actual (20.11.19) with value 10 days ago (10.11.19).
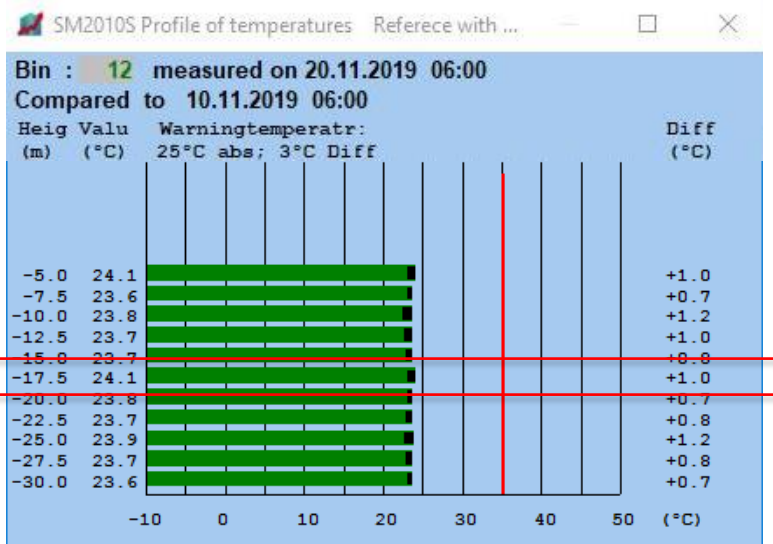
Example: The temperature value at the measuring point -17.5m is currently 24.1°C.
10 days ago, the temperature at this point was lower.
The change (+1.0°C) is outlined in black.

Picture 2: Reference Comparison: Actual (20.11.19) with value 4 days ago (16.11.19).
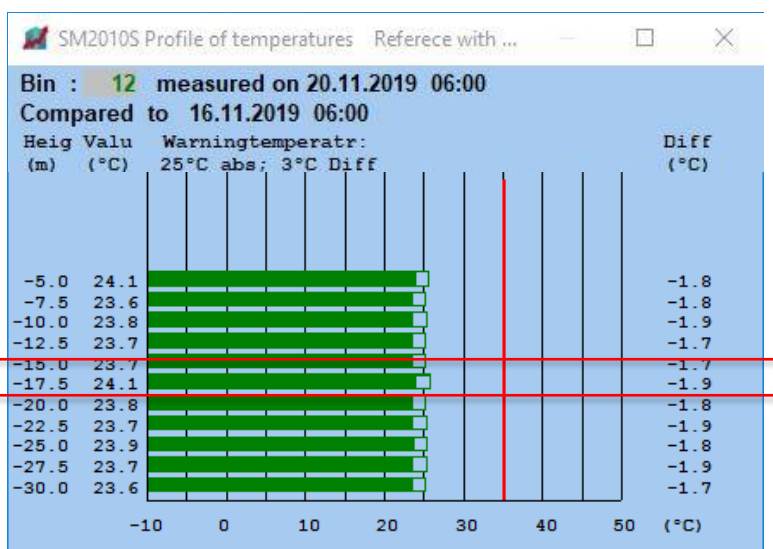
Example: The temperature value at the measuring point -17.5m is currently 24.1°C.
4 days ago, the temperature at this point was higher.
The change (-1.9°C) is outlined in white.

Set Alarms

Perform function: Menu → Configuration → Limits
In this dialog limits and alarm values can be set.

In the upper section:
Set alarm value for one bin: select bin
To handle all bins: Checkbox «Set globally for all bins»

Set Absolute Value: e.g. 25 (°C)
When sensor exceeds this value, an alarm is indicated.
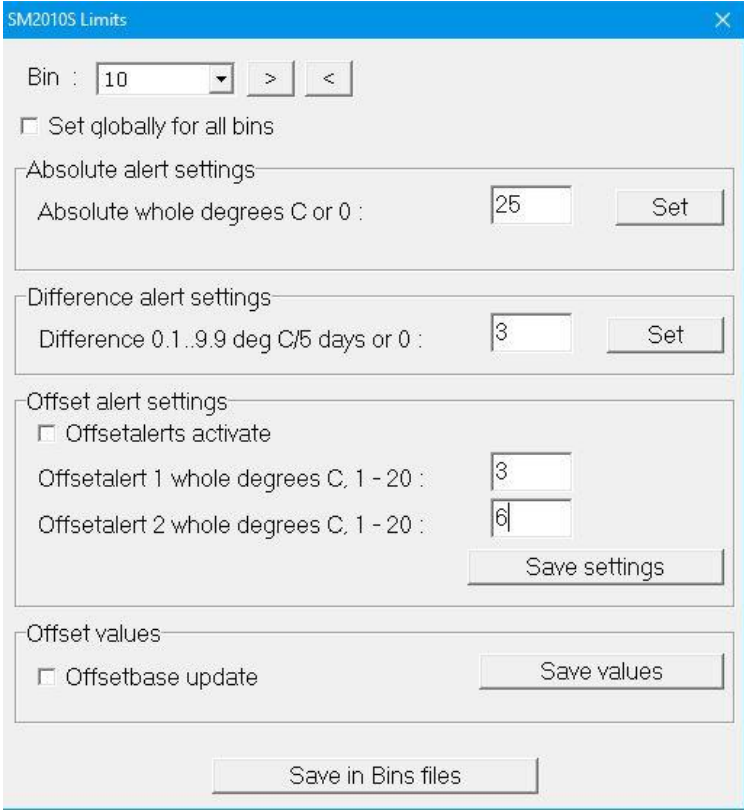
Set Difference Value: e.g. 3 (°C)
If temperature of one sensor exceeds the difference value within 5 days, an alarm is indicated.

⚠️	The settings are only saved if the button **[Set]** is confirmed. Quit dialog with **[Save in Bins files]** to activate alarm limits.

Picture Limits

The offset alarms 1 + 2 are explained in chapter **5.5.2 Limits**.

👉	Leave dialog by clicking on **[X]** to cancel entries.

5. Description of menu items

Basic functions:
There are seven main menus with different submenu items. Select main menu using a mouse or press ALT and the first letter of the menu on the keyboard. Select submenu items by mouse, the keys «up/down» or by entering the first letter of the menu. Press «enter» to confirm your selection. The open windows can be arranged individually on the screen.

⚠	Certain submenus are password-protected to prevent unauthorized access. Therefore, property owner should consider carefully who they give these passwords.

The main menu contains the following chapters:
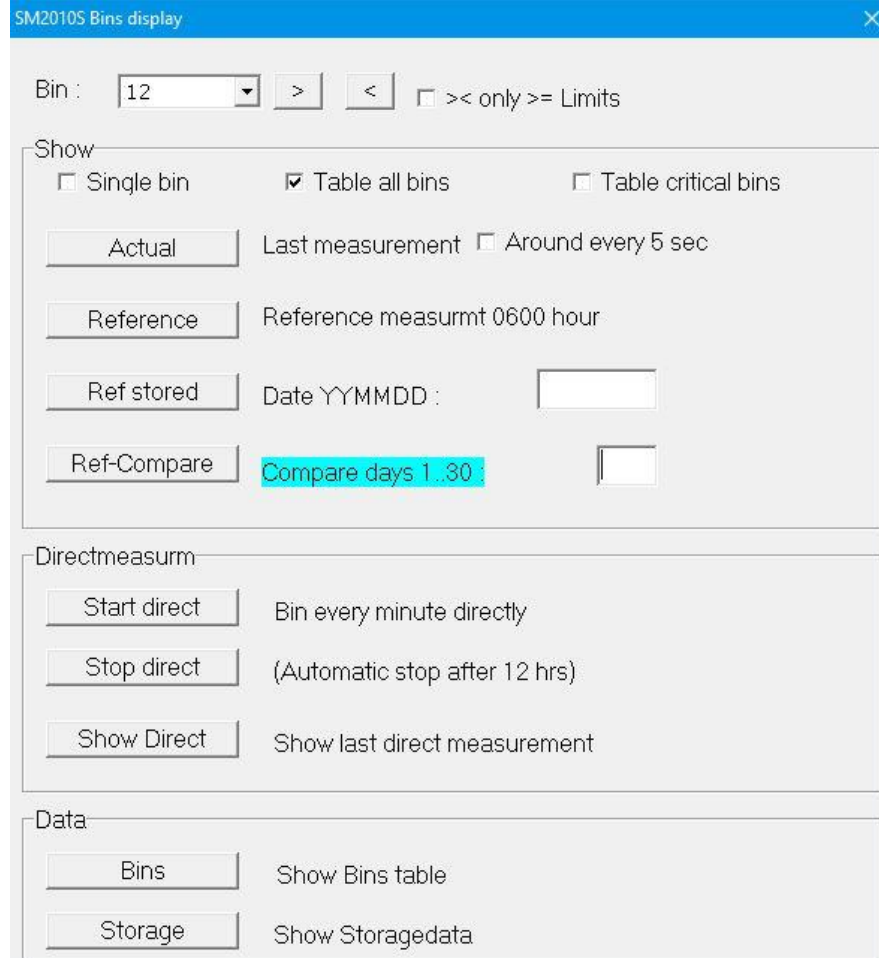
5.1. Display

In the display mode temperature values can be seen in a graph or in a table for comparison to previous measurements.

☞	If a single bin is selected, the data is displayed graphically. Choosing «Table all bins» or «Table critical bins» the display is in tabular form.

Picture: Bins display

Bin selection

Bin:
Select bin name with drop-down menu or search via **[>]** / **[<].**

Checkbox «> < only >= Limits»
Enables scrolling with buttons **[>]** / **[<]** in alarm bins only.

Show

Checkbox «Single bin»
Temperature display of this one bin as a graphic. Two new windows will appear: the temperature profile and the temperature course.

Checkbox «Table all bins»
Temperature display of all bins in tabular form.

Checkbox «Table critical bins»
Temperature display of all bins with alarm in tabular form.

[Actual]
Shows the last measured temperature values.

Checkbox «Around every 5 sec»
Shows the actual profile and corresponding course with change to next bin after 5 seconds.

[Reference]
Shows last reference measurement of 06:00 a.m.

[Ref stored] and input field
Shows reference measurement data of YYMMDD (year, month, day).

[Ref-Compare] and input field
Shows the last reference measurement with comparison of the last 1 to 30 days. The progression graph only shows measurement of the fixed time for reference measurement (06:00 a.m.). The connecting lines do **not** represent the course of the day, but the difference between day to day.

Directmeasurm

[Start direct]
Starts direct measurement of the selected bin under **Bin:** is just coupled to this selected one!
This means this bin is measured and displayed every minute. This function expires automatically after 12 hours.
For radio bins it may take up to 30 minutes until direct measurement starts and it can take even 2 hours if the net point was inactive.

⚠	Frequent direct measurements will shorten lifespan of battery of the radio probes.

Picture: Temperature profile of a direct measurement

Label	
actual value	
start value	
The set limits of the selected bin are shown for information.	
Height of the sensors in the measuring cable	
actual temperature	
Measured values in the chart always refer to the last measurement.	
Difference to previous measured temperature.	
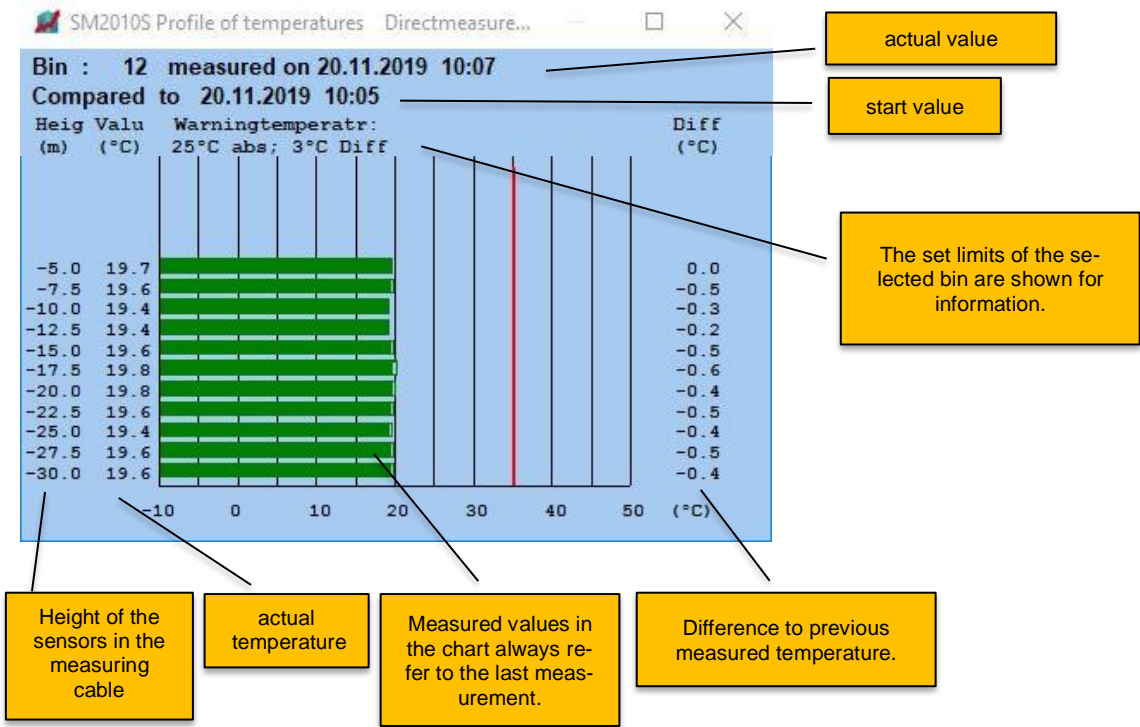
Picture: Temperature course
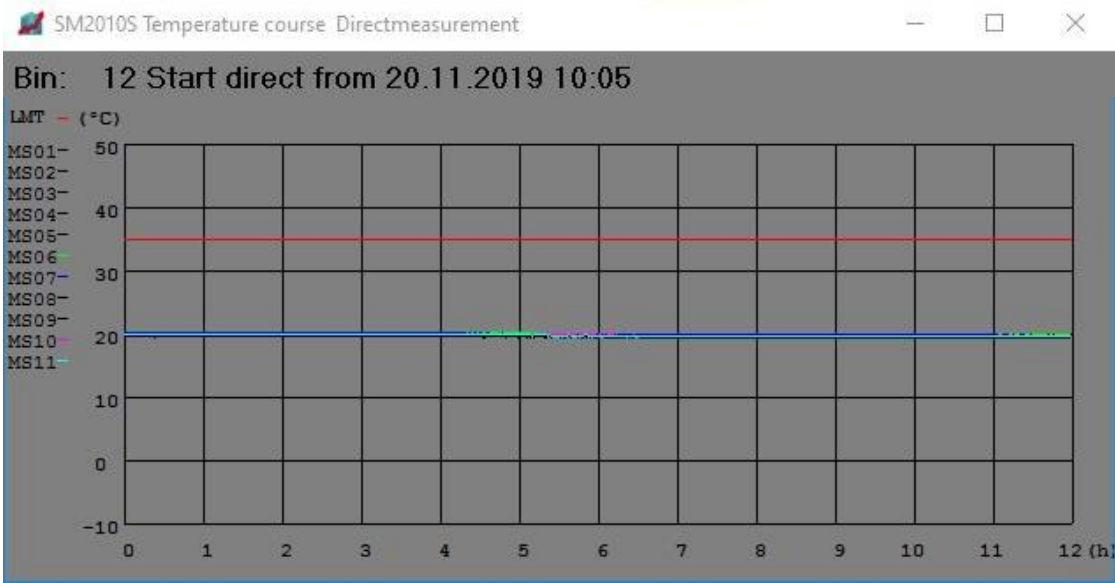
The temperature course of direct measurements is displayed for a maximum of 12 hours, otherwise for the last 30 days.

The title shows the definitions: actual bin, start date and start time. In the Y-axis the temperature value is displayed, the maximum recording time of 12 hours in the X-axis. The start time on the scale is zero. The red line highlights the entered absolute temperature limit of this bin.

[Stop direct]

Stops ongoing direct measurement after the next measurement.

[Show Direct]

Shows last direct measurement.

Data

[Bins]

Bin definitions are shown in tabular form.

Explanations of the individual columns (only for digital sensors)	
Zelle	Bin name
Radi	…
Typ	Type of temperature sensor (measuring element)
Nm	Number of measuring points in the measuring cable
AGw	Temperature, absolute limit value
DGw	Temperature, difference limit value
ADT	Number of the scanbox
Gehg	Identification number of temperature measuring cable
St	Port connection number in ADT-D Scanbox
M1	…
Intv	measuring interval
Höhen MS	Height of sensors in temperature measuring cable in meter

[Storage]

Shows the storage data in tabular form. In the example below, the bins have been grouped.
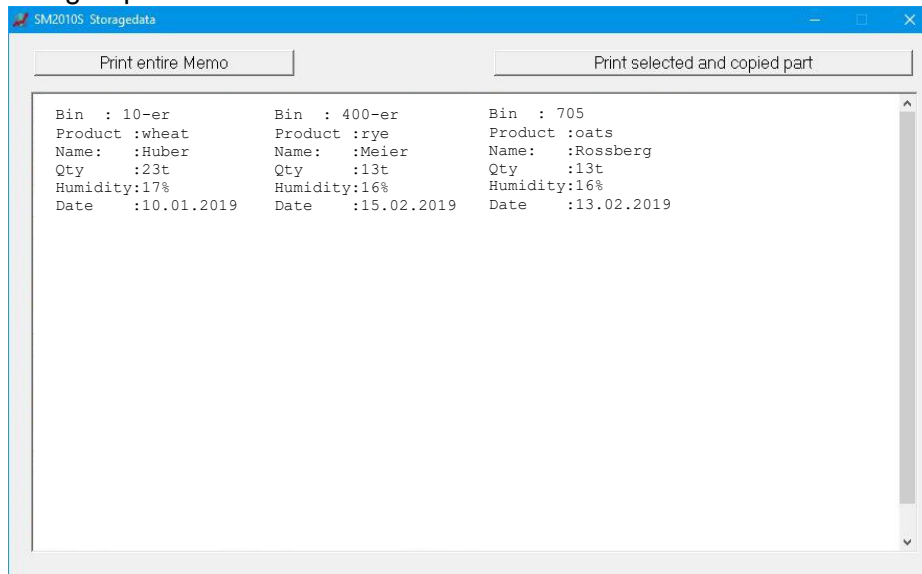
In both window views (Bins table and Storagedata) there are two buttons in the upper corners to print the data.

[Print entire Memo]

After pressing this button the Windows print menu is called up. Once printer has been selected and confirmed with [OK], the complete storage data file will be printed out.

Confirm: Really print the whole memo? → **[Yes] [No]**

[Print selected and copied part]

Select and mark text file before key is pressed to print out selected section.

An error message appears if nothing has been selected: «No Text selected and copied (mouse right!) !»

5.2. Printing

Bin values can be printed in different layout options.

Selecting bins

[Bins select]
> Pressing the button switches to the main window and select desired bins or groups individually with the left mouse button. The selected bins are marked with an icon in the upper left corner of the cell name.

> The right mouse button stops the selection and returns to the printing dialog.

Checkbox «none»
> Deselects already selected bins.

Checkbox «all»
> Marks all bins.

Checkbox «criticals»
> Marks only the critical (alarm triggering) bins.

After selection, you can choose the type of printout from the variants described below.

[Actual]
> Prints the last temperature values.

[Reference]
> Prints the last reference measurement taken at 6:00 a.m.

[Reference, comparison] and input field

Prints the last reference measurement in comparison of the last x days.
Enter a value between 1 and 30 days into the input field.

[Stored] and input field

Prints the reference measurement of the day YYMMDD (year, month, day).

[Course]

Prints the course of the reference measurements of the selected bin. The desired bin must first be selected in the main window. This function can only be applied to individual bins and not to groups.

[Course direct]

Prints the temperature course of the selected bin in direct measurement mode.

[Abort Printing]

Cancels the printing process. Other print jobs must be managed in the Windows printer queues.

Procedure: Open Windows-dialog *Units and Printer*.
Select printer with right mouse button.
From the menu select, *show print job*.
Mark the pending printing job with right mouse button
Select *interrupt print job*.
Wait until print job has been deleted by Windows.

5.3. Export
5.3.1. Preface

Bin values can be exported in different variants. Printing, generating and saving in PDF format in a directory is now implemented. The installation of the PDF24 Creator is mandatory. Download a free of charge version from the Internet. To work properly with SM2010S some settings must be made.

If a computer from Agromatic is included in the scope of delivery, the installation is already done. Otherwise follow chapter **2.2 Delivery without PC**.

5.3.2. Description Export dialog

Manual file export

Actual

[Actual as CSV] *
Exports the actual temperature values.
The data is saved in CSV format in the SM2010S folder under
…\Export\CSV\ACTUAL_ YYYYMMDDHHMM.csv

[PDF Aktuell]
Exports the actual temperature values.
The data is saved in PDF format in the SM2010S folder under
…\Export\PDF\ACTUAL_ YYYYMMDDHHMM.pdf

Reference from Date (YYMMDD) and input field

Enter a date into the input field in YYMMDD format (year, month, day).

[Ref as CSV] *
Exports the reference measurement of the selected date.
The data is saved in CSV format in the SM2010S folder under
…\Export\CSV\REFERENCE_ YYMMDD.csv

[PDF Referenz]
Exports the reference measurement of the selected date.
The data is saved in PDF format in the SM2010S folder under
…\Export\PDF\REFERENCE_ YYMMDD.pdf

* When importing csv data into Excel a comma must be specified as separator.

Automatic file export

If this function is activated, an automatic export is created daily after the reference measurement.

Checkbox «all bins»
All bins are exported.

Checkbox «only critical»
Only critical (alarm triggering) bins are exported.

Checkbox «create CSV»
The data is saved in CSV format in the SM2010S folder under
…\Export\CSV\REFEXP_ YYMMDD.csv

Checkbox «PDF erstellen»
The data is saved in PDF format in the SM2010S folder under
…\Export\PDF\REFEXP_ YYMMDD.pdf

Compare days 0…30 (only PDF) and input field
Prints the last reference measurement in comparison of the last x days. Enter a value between 1 and 30 days in the input field. Is only possible as PDF file. This function is switched off if you enter the number 0 (zero).

Save before Test Auto Report
> A test printout can be triggered for checking purposes. The definitions must first be saved using the key **[Save export parameters]** at the bottom of the dialog.

Automatic printing

If this function is activated, a printout is made daily after the reference measurement.

Printer
> Select a printer from the drop-down menu.

Checkbox «all bins»
> Selects all bins for automatic printing.

Checkbox «only critical»
> Selects only the critical (alarm triggering) bins for automatic printing.

The reference measurements of the selected bin(s) are periodically compared with a past measured value from the start date and printed out.

Starting date YYMMDD: and input field
> Enter start date (note format) → YY(year), MM(month), DD(day)

Repeat days 0…30: and input field
> Enter number of days, zero (0) = no repetition (disabled).
> The printout is made in the selected interval.

Compare days 0…30: and input field
> Enter number of days, zero (0) = no comparison
> The actual measured values are compared with the values x days ago.

Save before Test AutoPrint [Test AutoPrint]
> A test printout can be triggered for checking purposes. The definitions must first be saved using the key **[Save export parameters]** at the bottom of the dialog.

[Save export parameters]
> Saves the entered definitions.

5.4. Storage data

The storage data consist of three main menus: Characteristics, Product data und Product search. Each of the three main menus has 5 data lines (1: to 5:).
For each bin or group, storage data can be managed in three main menus.

The recording of Characteristics is password-protected. Enter the password after pressing the key **[Define]:** 863704

Picture: Storage data

Show bin:
> Select bin or group with drop-down menu or search via **[>]** / **[<]**

Properties (Eigenschaften)
> Input of a text (umbrella term for the entry in the corresponding field «Product data»),
> e.g: product, name, quantity ...   (see picture: storage data)

[Define]
> Changings of property text requires the entry of a password.

Checkbox «Print»
> Determines whether the product data should be printed in the temperature log.

[Save]
> Saves the property fields and "Print" in the file *SM2010N.cfg*.

Product Data (Produkt-Daten)
> Information on the specifications in the property lines.   (see picture: storage data)
> The product data details belong to the selected bin or group.
> (Example in picture: bin group 10-er)

[OK, go on]

Takes over and saves the storage data for bin (group) 10-er and goes on to the next bin.

[Delete]

Deletes the existing product data for bin (group) 10-er. Deleting must be confirmed.

[Save] (Product data)

Saves all product data in the file *LAGER.dat*.

Product search (Produkt-Suche)

Where is product stored and who is owner? To answer this question, search for the entered property texts using the example above.

1st ex.: In the first field insert the name of the product. After pressing **[Bins select]** all bins containing this product are marked with a printer symbol to the left of the bin name on the main window.

2nd ex.: In the first field insert the name of the costumer. After pressing **[Bins select]** all bins assigned to this costumer are marked with a printer symbol to the left of the bin name on the main window.

The search fields can also be combined.

[Bins select]

Performs the search according to the above criteria. On the main window, all bins that match these criteria are marked with a small rectangle in the upper left corner of the bin name.

Example: `Silo_1` or `705`

Hits:

The number of bins found is displayed here.

Picture: Example temperature report

The storage data is displayed here.
Only if checkbox «Print» is activated in the Storage data dialog!

Without data, lines are empty.

Without entry in property text these lines are not visible.

5.5. Configuration

The submenu contains the following chapters:

The submenu is password protected. The standard password is: 8637

5.5.1.   General Configuration

Plant Name
> Name of the plant, which appears as header of the main window.
> This entry can only be changed by Agromatic AG.

Printer Title
> Printout title, max. 40 characters.
> This entry can only be changed by Agromatic AG.

Language
> Selection of required language.

Font size (8-16)
> Selection of font size. Applies only to the bin names on the main screen.

Radio Channel
> Selection of radio channel 0 to 3, only for plants with wireless probes. Four different radio channels are available in order to avoid multiple connections.
> 0 = IEEE15, 1 = IEEE16, 2 = IEEE21, 3 = IEEE22. Switching the channel may take up to 30 minutes and is effective only starting from next regular measurement of the wireless probes. Standard is channel 0. This parameter should only be changed if several radio systems are operated in the same place.

[Choose Image] (Background image)
Selection of a background image, e.g. silo image (see example below)
Attention: Changings of the background picture causes a set back of the bins arrangement to the standard position.
The standard background picture is «default.bmp».

The bin names can be arranged individually on the silo image.

Customers data, max. 5 lines
Input of plant address, which is only used for the printout.

[Save Configuration]
All entries are saved in the config file *SM2010N.cfg*.

5.5.2. Limits

Different limits can be set, which trigger an alarm in case of exceeding limit values.

Select bin

bin:
Select bin name with drop-down menu or search via **[>]** / **[<]**

Checkbox «Set globally for all bins»
Allows to take over the set values for all bins.

Absolute alert settings

An alarm is triggered if a measuring point exceeds the set limit value.

Absolute whole degrees C or 0: and input field
Enter absolute limit in range 1°C – 60°C,   standard value = '35'
If 0°C is entered, the alarm is not activated.

[Set]
The entered value is not accepted until this key has been pressed for confirmation.

Difference alert settings

An alarm is triggered if the measured value of a measuring point exceeds the preset limit value within 5 days.

Difference 0.1 .. 9.9 deg C/5days or 0: and input field
Enter difference value in range from 0.1°C – 9.9°C,   standard value = '5'
If 0°C is entered, no alarm will be triggered.

[Set]
The entered value is not accepted until this key has been pressed for confirmation.

Offset alert settings

With the offset alerts 1 + 2 two additional alert limit values can be set. The value of offset alert 2 must be equal or higher than offset alert 1. Offset alerts are set for each sensor individually. An alarm is triggered if one or more measured values (measuring points) are exceeding the offset base by the value set for offset alarm 1 or offset alarm 2.

Checkbox «Offsetalerts activate»
    Check if alarms shall be taken over.
    Uncheck if alarms shall be deactivated.
    It is not sufficient to simply check or uncheck the box, this selection must be confirmed by pressing key **[Save settings]**.

Offsetalert 1 whole degrees C, 1 – 20:
    Enter first offset value in range from 1 to 20°C.

Offsetalert 2 whole degrees C, 1 – 20:
    Enter second offset value in range from 1 to 20°C.

[Save settings]
    Only by pressing this key the offset alarm values are confirmed and activated or deactivated.

Offset values

IMPORTANT: In order to be able to set alarm values at all, a base must be available. Valid measured values must therefore be available (reference measurement).

Checkbox «Offsetbase update»
    Check if offset base is to be set and the offset alarms are to be updated downwards.
    Uncheck if update of the offset base is to be deactivated.
    It is not sufficient to simply check or uncheck the box, this selection must be confirmed by pressing key **[Save values]**.

	Due to the season or outside temperature, the temperature of the stored product can change downwards. In order to ensure an alarm in the event of a rise in temperature, the alarm base is checked after each reference measurement and reset at a lower product temperature. This way an alarm is triggered as soon as the temperatures are exceeded by the defined offset value.

[Save values]
    Set the current measured values as offset base. The function is only executed and activated or deactivated when this key is pressed.

	Offset values can only be set if valid temperature data is available.

[Save in Bins files]
    Saves the set values in the files *ZELLEN.dat* and *TOFFBasis.dat*.
    The information is displayed in the status bar in the main window.

5.5.3.   Assign Bins positions

The defined bin numbers can be positioned individually on the background picture resp. the silo schema.

⚠	On the background picture 'default' the bin numbers are displayed in table form. On all other pictures the bin numbers are positioned in the left upper corner. This means only one number is visible. After positioning bin numbers all bins will be visible.
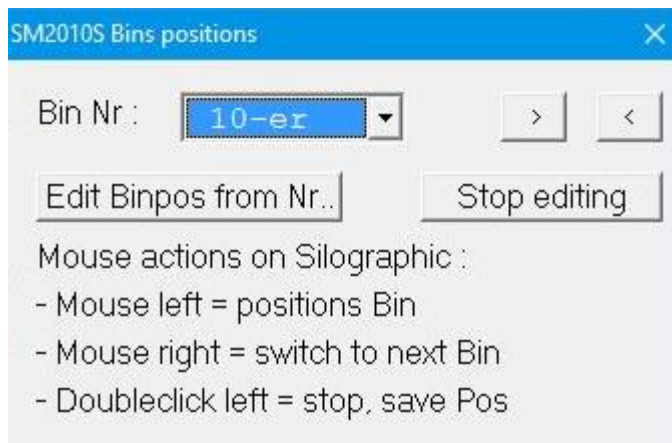
Select bins

Bin No:
 Select bin name with drop-down menu or search via **[>]** / **[<]**

[Edit Binpos from Nr.]
 Only after pressing this key the selected bin name can be positioned with the mouse on the background image in the main window.

↖	Move mouse cursor to required position in the picture.
🖱	Press left mouse button and bin number will be positioned.
🖱	Switch to next bin number with right mouse button.

 A double-click with the left mouse button saves the defined positions.

[Stop editing]
 This key can also be pressed instead of double-clicking with the left mouse button.

 Both actions stop editing and save the defined positions in the file *ZELLEN.dat* .

5.5.4. Window position/size save

All window positions are saved. After reactivating monitor from screen save mode all windows should be on the same position. This function is only available from Windows 7.

5.5.5. Reset Password

Once the password has been entered, access to the protected menus always remains open. Only a restart of the program SM2010S would cancel this. Selecting the menu «Reset Password» has the same function. The submenus will be relocked.

5.5.6. Configure groups

With the latest version of the Silomanager (version 2019 up), operators of silo plants have the possibility to combine the individual measuring cables into groups.
If several measuring cables monitor the temperatures in a silo, all these cables can be combined into a group and a name can be assigned to the group. Only the group name (bin name) will then be visible on the main window.

	It is absolutely necessary to enter all height data of the individual measuring points correctly. Only this way a realistic representation can be calculated.

Example:
The illustration below shows that the group «Silo_1» consists of the measuring cables 10, 11, 12 and 13. All these measuring cables hang in the same silo. The group «Silo_2» is also structured this way.
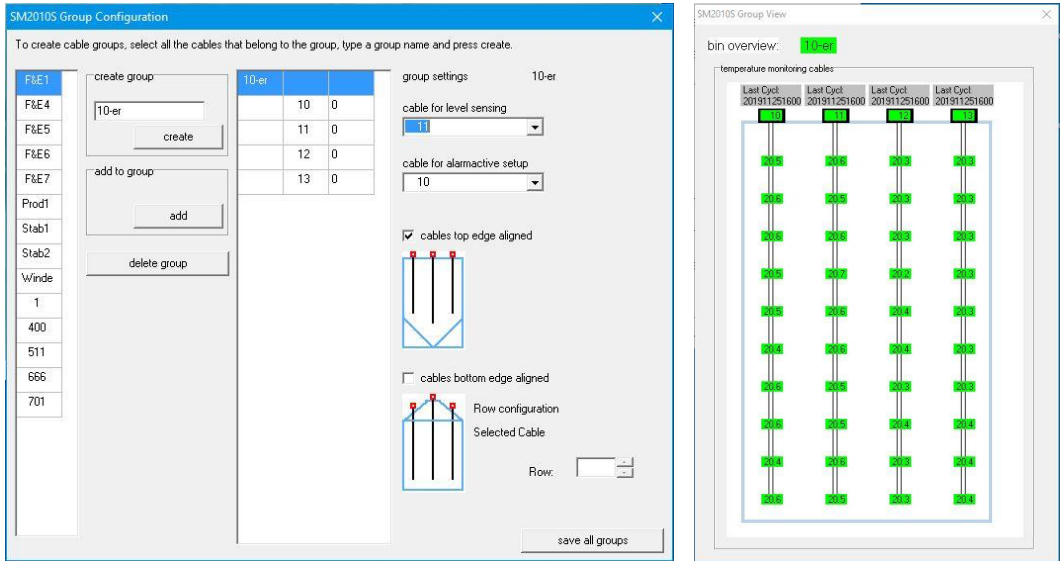
The groups are created as follows:

In the left part of the dialog (no. 1) you can see the list of the individual measuring cables with their numbers. These are now assigned to groups.

Step 1:   Mark the first measuring cable (only one) in the left column.
Step 2:   Enter a group name.
Step 3:   Press **[create]** to create the group. The group currently contains only one meas-
            uring cable.
Step 4:   Select another measuring cable in the left column.
Step 5:   Press **[add]** to add the measuring cable to the created group.
Step 6:   Add more measurement cables to the same group until the whole group is com-
            pleted.
Step 7:   Configure next group – Restart with step 1
Step 8:   Save configuration with **[save all groups]**.
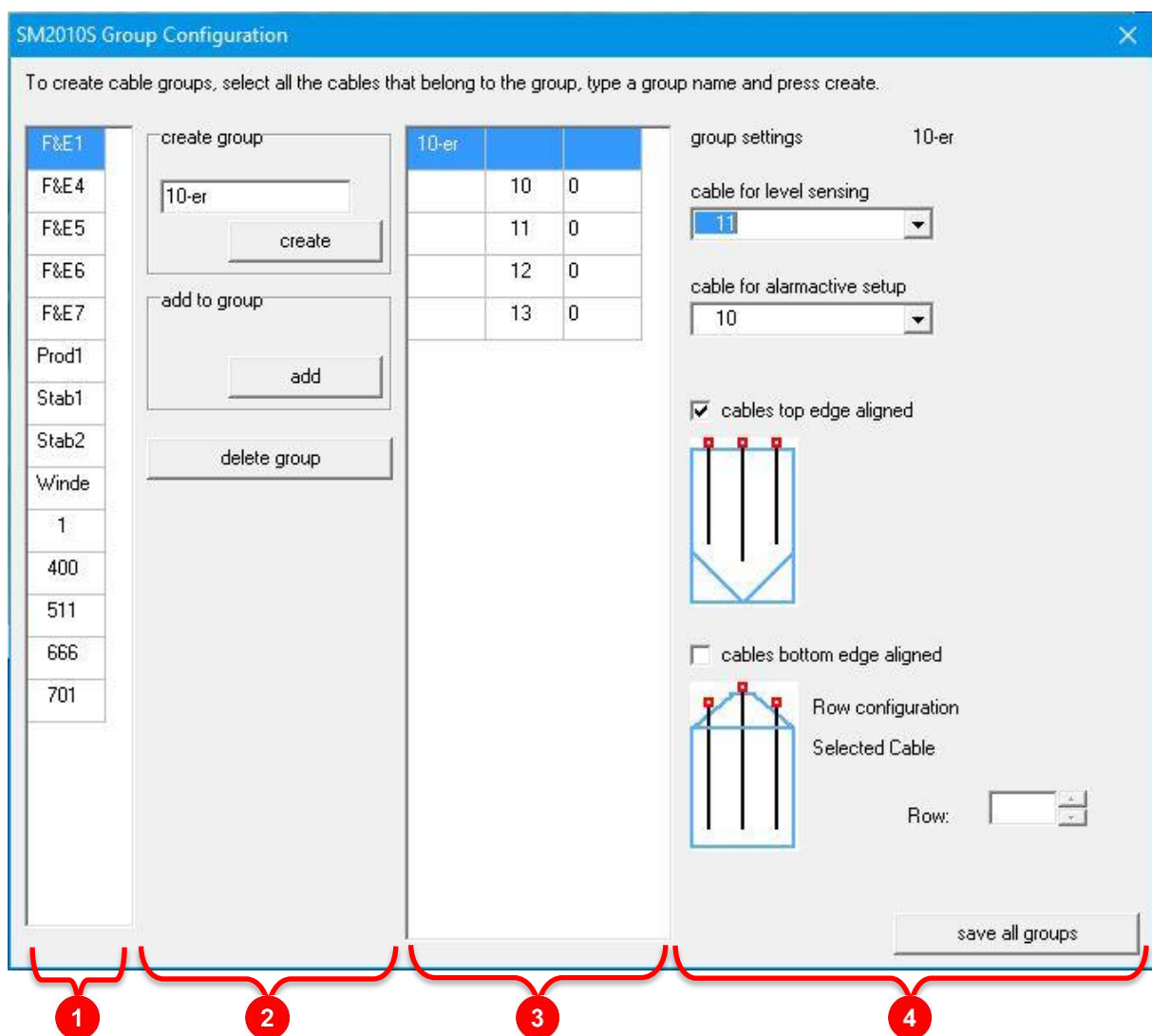
Structure of the Group Configuration dialog

1:     The left part contains the <u>list of all available measuring cables</u>.

2:     In the <u>Group Configuration area</u>, the groups are created or deleted.

3:     The list of the <u>created groups</u> is shown in a 3-column table.
       - The group name is listed in the left column.
       - The measuring cables that belong to this group are listed in the middle column
       - The position of the measuring cable in the silo can be indicated in the right column of
         the table. The exact description follows below.
4:     The group definitions can be made in the right area.

Create group

Input field
    Enter group name. Maximum 6 characters are allowed.

[create]
    Press this button to create the group. The group is displayed in the middle part of the
    dialog, with all the measurement cables assigned to it.

Add to group

[add]
    To add another measuring cable to a group, the group (group name) must be marked.
    Then the measuring cable to be added to the group is selected in the left section. By
    pressing [add], this measuring cable is added to the selected group.

[delete group]
    Pressing this key deletes the marked group. All measuring cables which were included in
    this group appear in the left selection list again.

Area «created groups»

Table with groups, displayed in three columns
    1st column: group name
    2nd column: measuring cable number
    3rd column: Indication of position (level) in the silo

Area: group definitions

    To further define a cable group, it must first be selected in the area «created groups». For
    control purposes, the group name is displayed in the group settings.

Cable for level sensing
    One measuring cable can be assigned to the selected group, which monitors and evalu-
    ates as a level indicator. This requires that all collected values of this cable are currently
    available. Values measured within 24 hours are compared with each other. Measuring
    points inside the product react differently to temperature changes than those outside the
    product.
    The temperature drift of the individual measuring points in the selected measuring cable
    can be used to determine the approximate level in the silo.

Behind the measurement there is a very complex and delicate calculation and it is possible that the display shows «NO DATA» for a long time. This can be explained by the fact that the calculations do not provide an acceptable result. The longer the aquiring of measurement takes, the more likely it is that the calculation will be successful.

Cable for alarmactive setup

One measuring cable can be assigned to the selected group, which is evaluated for the alarm. This requires that all measured values for this cable are always available.

If the function «deactivate alarms» is used, a cable must be defined in each group, which defines the classification of the alarm heights. The heights of the individual measuring points of this cable are then used to calculate the alarm switch-off height and converted to the other cables in the group.

The longest cable should always be selected by default.

Checkbox «cables top edge aligned»

The design of the silo can be specified here. If the silo is built the way the graphic shows, you can check this box. All measuring cables are flush at the top. This is also the default display. This variant is normally used for concrete silos. All measuring cables start at the same height at the top and hang into the silo of different lengths.

Checkbox «cables bottom edge aligned»

The design of the silo can be specified here. If the silo is built the way the graphic shows, you can check this box. All measuring cables are flush at the bottom. This variant is normally used for steel silos. The measuring cables start with the sloping silo roof at different heights and all reach up to the same height into the silo.

Row Configuration

In addition, a configuration of the rows can be made here, how the measuring cables are arranged in the silo.

Procedure:
Mark a measuring cable in the created groups.
The marked cable is displayed under «Selected cable».

Row:

Select row with drop-down menu or search via **[▲]** / **[▼]**

Mark the next cable and assign it to a row.
Continue until all cables are assigned to a row.

Below an example, a silo with 7 measuring cables, arranged on 4 rows.

All cables in the outer row are on level 0. Level 1 defines the next row (always seen towards the middle).
The center in our example is level 3.
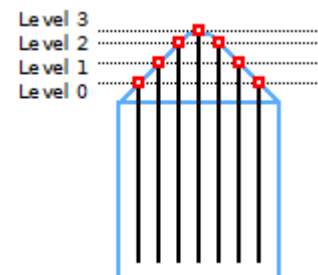
To create cable groups, select all the cables that belong to the group, type a group name and press create.

F&E1	create group	Silo_1		
F&E4	Silo_2		10	0
F&E5	create		11	0
F&E6			12	0
F&E7	add to group		13	0
Prod1		Silo_2		
Stab1	add		400	0
Stab2			511	0
Winde	delete group		666	0
1			701	0

Level view:

The individual rows can thus be assigned to the measuring cables.

[save all groups]
Saves all changes in the file «SM2010N_GroupConfig.cfg».

Close window with **[x].**

Click on a bin name in the main window. Here is a view of grouped measurement cables.
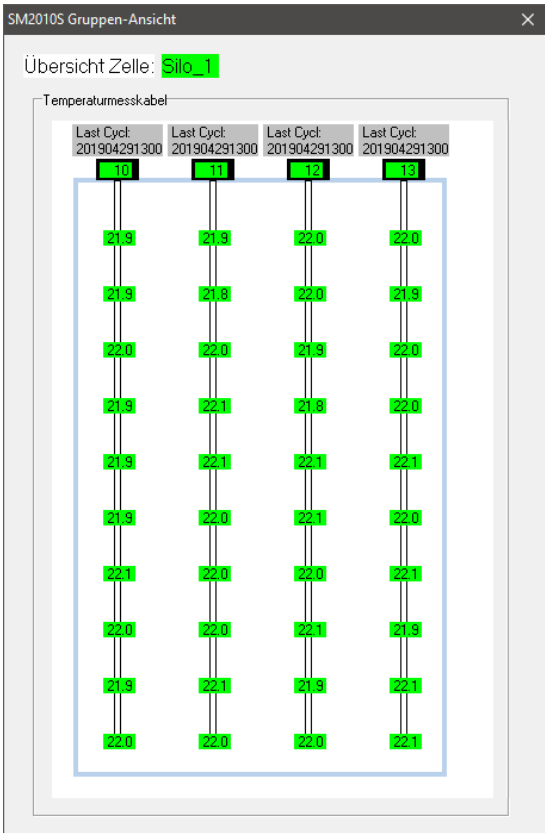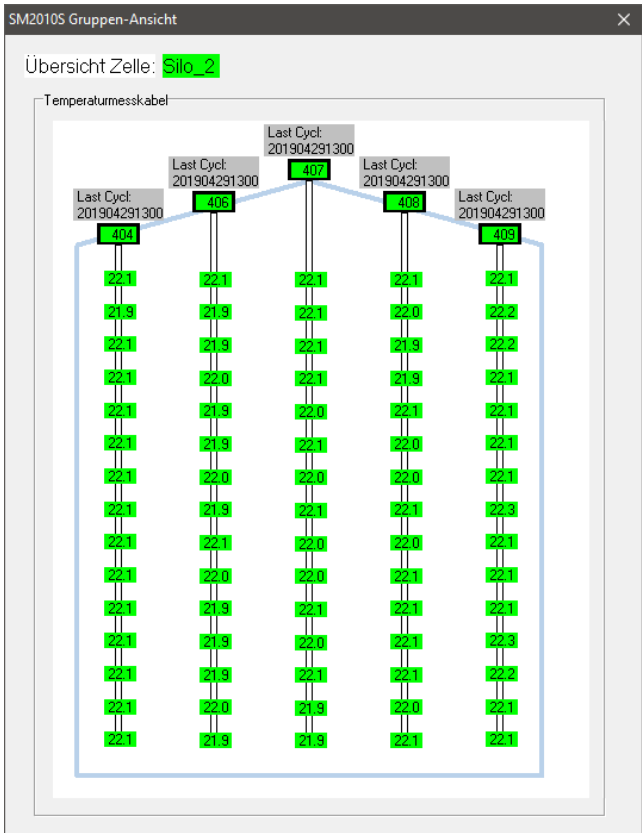
Cables top edge aligned   Cables bottom edge aligned

5.6. Maintenance

This submenu is used to configure the entire temperature measuring system. Usually, the customer does not have to make any settings here. The bin files are created by Agromatic AG and are already preconfigured.

 Please note that incorrect entries and settings in this menu may lead to incorrect measurements or even to a total failure of the entire system!

The submenu contains the following chapters:

Edit bins table	5.6.1.
Logfile	5.6.2.
Data manage	5.6.3.
Send T,00 to ADT-D's	5.6.4.
Get all bins	5.6.5.
Stop getting bins	5.6.6.
Test Data	5.6.7.
Test ADT, Netpoint-Status	5.6.8.
ADT data bus-Monitor	5.6.9.
Initialize radio-bins	5.6.10.
Configure digital bins	5.6.11.
COM-Server	5.6.12.
Installation	5.6.13.

The submenu is password protected. The password for access is: 863704

5.6.1. Edit bins table

The different temperature measuring cables can be configured via this menu.

There are 3 different sensor types:
ADT: Configuration of analogue temperature sensors
ADT-D: Configuration of digital temperature sensors
radio: Configuration of radio probes

Only trained specialists should make changes here. Incorrect settings can lead to incorrect measurements!
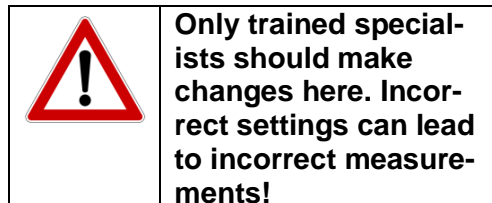
External Binname 6-chars:
    Enter explicit bin name.
    Max. 6 chars are allowed, letters and numbers (e.g. 324F or Silo1A).
    Selection is only possible via drop-down menu with mouse.

Radio Binnumber 100…3099:
    ADT: Is not needed, enter 0.
    ADT-D: Is not needed, enter 0.
    radio: Allowed values between 100…3099.
    Selection is only possible via drop-down menu with mouse.

Type A=ADT, T=Thermistor, P=PT10000, D=ADT-D:
    Configuration of the type of temperature measurement in the respective temperature measuring cables.
    ADT: Allowed only = A.
            A = Thermistor or PT10'000
    ADT-D: Allowed only = D.
            2-wire technology (digital)
    radio: Allowed are = T, P
            T = Thermistor and P = PT10'000.

[Radiobin to Netpoint]
Sending the current configuration of wireless temperature system to the wireless access point (ADT-F).

[All Radiobins to NPs]
Sending the current configuration of wireless temperature system to the wireless access points (ADT-F). The configuration memory is first cleared and then backed up again in the flash memory of the wireless access point.

Nr of sensors 1...16, Radio to 14:
Setting the number of installed measuring points per bin (temperature measuring cable).
ADT: Allowed values between 1…16.
ADT-D: Allowed values between 1…16.
Funk: Allowed values between 1…14.

Absolute-limit Degrees C (0 none):
Determination of the limit value between 10°C and 60°C, no alarm at 0°C.
An alarm will be indicated, if one sensor exceeds the set limit.
The standard value is 35.

Difference-limit Deg C by 5 days. 0..9.9:
An alarm is indicated, if temperature in one sensor exceeds the set value within 5 days. (The duration of 5 days cannot be altered).
The standard value is 5.

Checkbox «BinName/CableNr»
Allows to display predefined bins in the current table.
These bin names shall serve to identify a temperature measuring cable with the height specifications.
This table is predefined by Agromatic.

[Sort bin names]
Sorts the actual bin table alphabetically in ascending order. This action must be confirmed with **[Bins save]**.

[Delete ADT 230 bins]

⚠	Deletes 230 empty bins in the actual bin table and the display as well.

Checkbox «delete also in 230»
Inactive.
Access to this checkbox is protected by a special password and is reserved solely for Agromatic AG.

Checkbox «update all 230s»
Inactive.
Access to this checkbox is protected by a special password and is reserved solely for Agromatic AG.

Sample-Interval, 0=0600 only or x*30 minutes to 720 minutes:
Enter the measurement interval between 30min and 720min or '0' for 06:00 a.m.
ADT: The standard value of the analogue measuring cables is '120'.
ADT-D: The standard value of the digital measuring cables is '120'.
radio: The standard value of the radio spear probe is '60'.

Height of sensors from top. 0...99.9 meters each delimited with, eg 1.5,3,5.2..:
Enter the heights (position in meters) of the measuring points in the temperature measuring cable, starting from the top, max. 16 values are possible. All values must be entered one after another in the window and separated by ";" (semicolon).

The values are saved during continuous configuration and only need to be adjusted if changes are made.

This information is mandatory in SM2010S.

The number of height values must correspond to the number of measuring points in the measuring cable. Otherwise neither group functions nor functions «Deactivate alarm» and «Level sensing» can be used.

SM2010S	✕
Invalid height data. Check if there exists correct height data for every MP	
	OK
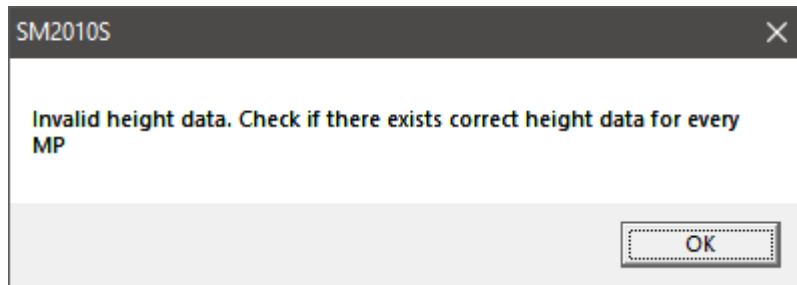
Entering too few height values leads to an error message.
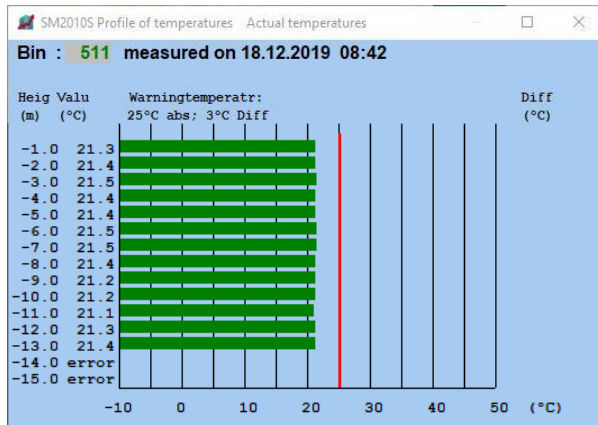
If too many height values are entered, the software does not notice this at first. Once the first measurement is made on this cable, a sensor error is displayed.

The profile of temperature then shows that measuring points are apparently missing.

In this case the measuring cable and/or the inputs must be checked.

[OK, go on]
Saves the data, goes to the next bin.

[>]
Jumps to the next bin.

[<]
Jumps to the previous bin.

[Delete]
Deletes all information about the selected bin from memory.
The deletion procedure must be confirmed.

[Insert]
Creates space to insert a new bin.

[Bins save]
[Bins save] saves the internal bin table in *ZELLEN.dat* and reorganizes the order of all temperature and storage data in the case bins have been deleted, added or their external bin names changed.
If new empty bins (ADT 230) have been defined and they are not yet in the file *ZELLEN230.dat*, they are appended there. *ZELLEN230.dat* usually contains only the digital bins of a system.
It can only be deleted with the Windows File Manager, but however should be saved for later reconfiguration!

5.6.2. Logfile
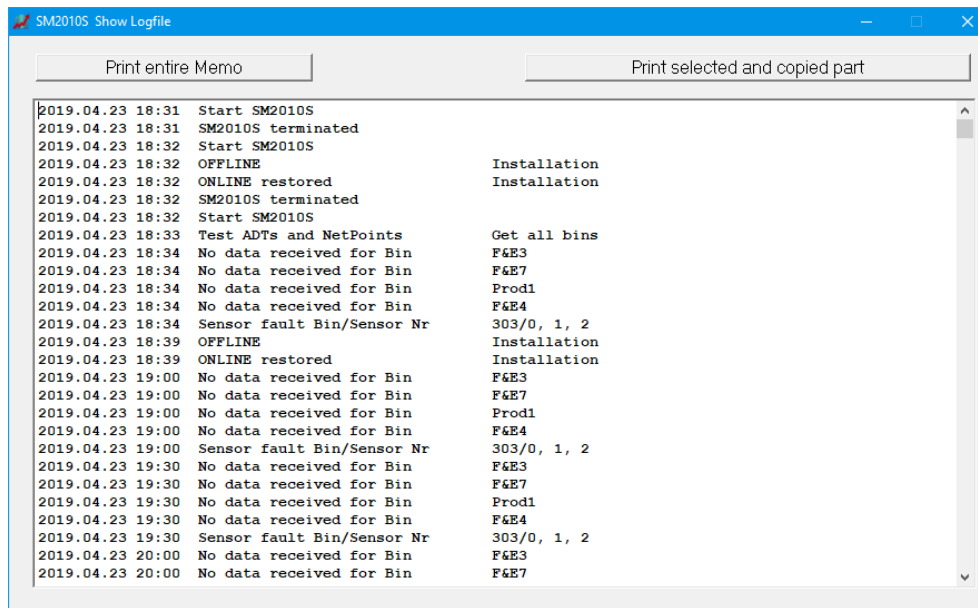
All actions are logged and written to the *LOG.txt* file.

[Print entire Memo]
Prints the complete LOG file on the printer.

Confirm: Print entire Memo? → **[YES] [NO]**

[Print selected and copied part]
Before pressing this button, the section to be printed must be marked in the displayed text file. Normal Windows function: mark and copy with the right mouse button. The selected section is then printed.

An error message appears if nothing has been selected: «No text selected and copied! (right mouse button)».

5.6.3. Data manage

Save or delete data.
Usually this menu item is inactive.

⚠	Please note that incorrect entries and settings in this menu may lead to incorrect measurements or even to a total failure of the entire system!
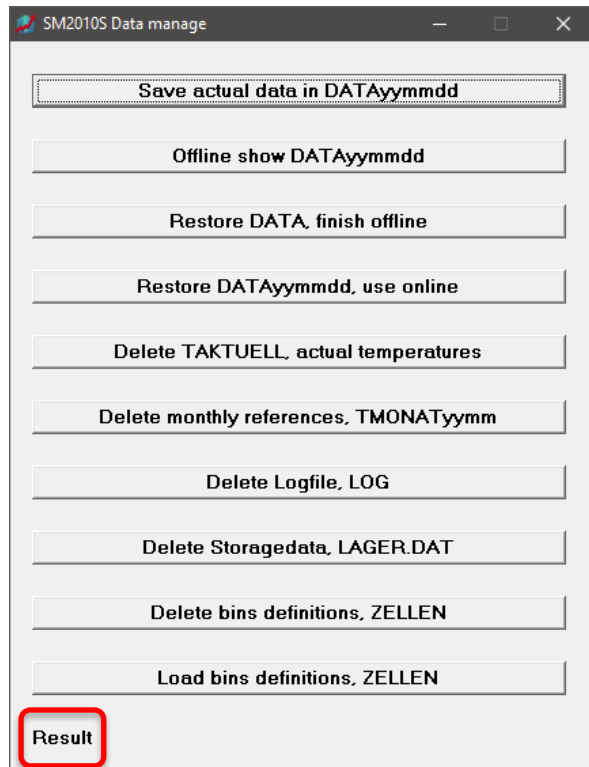
[Save actual data in DATAyymmdd]
Stores the current data (measured temperature values) and all configurations in the files *TAKTUELL.dat*, *TMONATyymm.dat*, *ZELLEN.dat*, *LAGER.dat*, *SM2010.cfg* and *LOG.txt* in the subdirectory DATAyymmdd.
Ex.: DATA100720 as status of 20th July 2010.

Result: Data saved in Directory DATAyymmdd.

[Offline show DATAyymmdd]
Displays the stored data of yymmdd offline, measurement query is interrupted!

Result: Offline showing Data of Directory DATAyymmdd

[Restore DATA, finish offline]
Query of temporarily stored, current data from the subdirectory DATA (if available) and restart measurement data enquiry cycles.

Result: Actual data loaded, online again!

⚠	The measurement query is only resumed when **[Restore DATA, finish offline]** is pressed!

[Restore DATAyymmdd, use online]
> Query of the data stored on the ddmmyy, continuation of the query cycle.

Result: DATA yymmdd loaded, used online!

[Delete TAKTUELL, actual temperatures]
> Delete the data file *TAKTUELL.dat*.

Result: TAKTUELL.DAT was deleted! (marked red)

[Delete monthly references, TMONATyymm]
> Delete the reference data file (monthly data) in the working directory.

Result: Files TMONATyymmdd.DAT deleted! (marked red)

[Delete Logfile, LOG]
> Delete the actual logfile *LOG.txt*.

[Delete Storagedata, LAGER.DAT]
> Delete the storage data files *LAGER.dat*.

Result: Storage data deleted! (marked red)

[Delete bins definitions, ZELLEN]
> Delete bin files *ZELLEN.dat*.

Result: No more bins defined, need to edit new bins! (marked red)

[Load bins definitions, ZELLEN]
> Loading of *ZELLEN.dat,* e.g. after invalid changes in the bin table and before saving.

Result: Actual ZELLEN loaded!

When you press "Delete" you will always be asked if you really want to delete!

5.6.4. Send T,00 to ADT-Ds

The system sends a measuring point query command to all ADT-D. All digital scanboxes will then start recording current measured values at the same time.

5.6.5. Get all bins

The system collects the current measured temperature values of all connected and initialized bins! Depending on the size of the temperature monitoring system this may take quite a long time. This action can be stopped with «Stop getting bins».

5.6.6. Stop getting bins

Terminates a query of date or «Get all bins» scan.
No measurement data are recorded to the PC.

5.6.7. Test Data

Password protected.
This function randomly generates bin numbers and values. Never use this function for configured systems!

5.6.8. Test ADT, Netpoint-Status

inactive.

5.6.9. ADT data bus-Monitor

Displays all outgoing (>) and incoming (<) messages which are transferred the ADT data bus.

```
SM2010S ADT data bus Monitor                                                                    ✕

RS485  sent (>);  received (<) :                    ☑ Autoscroll to last command   Print Memo   Clear Memo

16:14:16: >:3,Z,0,161416
16:13:16: >:3,Z,0,161316
16:12:16: >:3,Z,0,161216
16:11:16: >:3,Z,0,161116
16:10:16: >:3,Z,0,161016
16:09:16: >:3,Z,0,160916
16:08:16: >:3,Z,0,160816
16:07:16: >:3,Z,0,160716
16:06:16: >:3,Z,0,160616
16:05:16: >:3,Z,0,160516
16:04:16: >:3,Z,0,160416
16:03:16: >:3,Z,0,160316
16:02:16: >:3,Z,0,160216
16:01:16: >:3,Z,0,160116
16:00:33: >:1,E0,00,1,00, 1
16:00:32: <:2, 1, 22.7
16:00:32: >:R,01,8, 705, 1
16:00:32: <:2,15, 22.3, 22.4, 22.4, 22.3, 22.3, 22.3, 22.3, 22.4, 22.3, 22.3, 22.3, 22.4, 22.4, 22.3, 22.3
16:00:31: >:R,01,2, 409,15
16:00:31: <:2,15, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.0, 22.1
16:00:30: >:R,01,1, 408,15
16:00:30: <:2,15, 22.2, 22.3, 22.2, 22.3, 22.1, 22.2, 22.1, 22.2, 22.1, 22.1, 22.3, 22.1, 22.2, 22.1, 22.1
16:00:29: >:R,01,4, 407,15
16:00:29: <:2,15, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1
16:00:28: >:R,01,3, 406,15
16:00:27: <:2,15, 22.3, 22.1, 22.3, 22.2, 22.3, 22.3, 22.2, 22.3, 22.3, 22.2, 22.3, 22.3, 22.3, 22.3, 22.3
16:00:27: >:R,01,5, 404,15
16:00:27: <:2,10, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.1, 22.2
16:00:26: >:R,01,6,  13,10
16:00:25: <:2,10, 22.1, 22.1, 22.1, 22.1, 22.1, 22.2, 22.1, 22.2, 22.1, 22.1
16:00:25: >:R,01,6,  12,10
16:00:24: <:2,10, 22.1, 22.0, 22.1, 22.2, 22.1, 22.1, 22.1, 22.1, 22.1
16:00:24: >:R,01,7,  11,10
```

Checkbox «Autoscroll to last command»
  Allows to jump to the last (newest) record in the list.

[Print Memo]
  The Windows printer menu is displayed. If «PDF24 PDF» is selected as printer, a PDF file is created in the SM2010S export folder.
  Prints maximally the last 90 messages.

[Clear Memo]
  Deletes the current list of all messages.

Close window with **[x]**.

5.6.10. Initialize radio bins

If no wireless probes are used in this temperature monitoring system, this point of the manual can be skipped.

If the temperature monitoring system contains wireless probes, these must be logged into the system or a receiver (ADT-F/ wireless access point). Logging in means that a wireless access point (ADT-F) must be taught which wireless probes it has to communicate with.

```
┌─────────────────────────────────────────────────────────┐
│ SM2010S : Initialize Radio-Bins                       ✕ │
├─────────────────────────────────────────────────────────┤
│                                                         │
│  Radio Bin-number 100..3099 :          ┌──────────────▼┐ │
│  Select or enter new number            └───────────────┘ │
│  Initializing-Netpoint-number 1..30 :         ┌────────┐ │
│                                               └────────┘ │
│  Newly loaded Bin with flash first erased connects to the netpoint │
│                                                         │
│  and waits then max 30 seconds until "Initialize" ist  pressed. │
│                                                         │
│  Wait for connect=Bin single flashes. Wait for "Initialize"=Bin double │
│                                                         │
│  flashes. Initialized=Bins LED multiply flashes. Not initialized │
│                                                         │
│  =Bins LED flashes permanently and slowly                │
│                                                         │
│  ┌────────────────────┐         ┌──────────────────────┐ │
│  │ Activate netpoint  │         │  Initialize Radio Bin │ │
│  └────────────────────┘         └──────────────────────┘ │
│                                                         │
│  Result                                                 │
│       ┌──────────────────────────────────────────────┐  │
│       │ Leave to restart periodic data collecting !  │  │
│       └──────────────────────────────────────────────┘  │
└─────────────────────────────────────────────────────────┘
```

Radio Bin-*number 100…3099:*
   Select a clear, max. 4-digit bin number from drop-down box or enter a number.

Initializing-Netpoint-*number 1…30:*
   Each receiver of the wireless probes (ADT-F/wireless access point) has a unique address in the data bus (Agromatic-DataLine). Enter this address here.
   If the entry is made on a plant with several network points, the wireless probe must be registered into the "correct" network point (ADT-F/wireless access point)! The communication with the other wireless probes is interrupted during registration. To control communication between SM2010S and network point, activate the RS485 monitor.

[Activate netpoint]
   Activates the initializing network point, sets the radio channel = 0.

[Initialize Radio Bin]
   Sends a status query to the wireless access point (ADT-F), which previously received a request for registration from a reloaded wireless probe. A parameter with the assigned wireless probe designation is transmitted.

<u>Result</u>
   Short text messages about the status of the action and whether a registration was successful or not are displayed here.

[Leave to restart periodic data collecting!]
Closes the window and goes back online. As long as this window is open, no measurement data are transferred. The system is on hold and a red bar appears on the main window below.

After registration:

Perform function: menu → maintenance → Edit bins table

Call up the radio bins and enter identification of a radio probe participant. Once the configuration is completed, the radio bin is included in the "query routine".
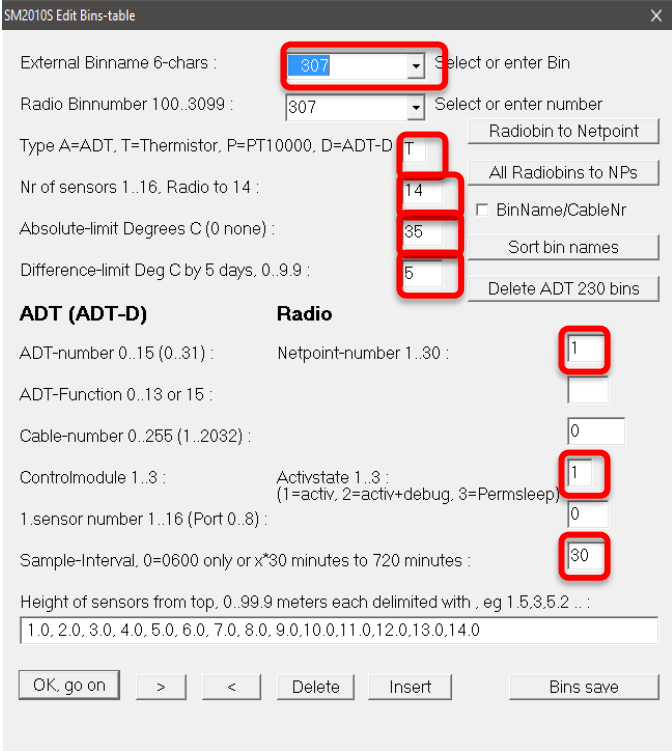
5.6.11. Configure digital bins

Read-in of digital measuring cables.

ADT-D number decimal 0...31:
>   Enter an ADT-D address.

Common settings for all bins of this ADT-D:
>   Absolute and difference limits are parameters that are used for all reported digital measuring cables. If necessary, the values can be adjusted later manually and individually via the menu: Configuration → Limits

Absolute-limit degrees C(0 none):
>   The desired absolute alarm in degrees Celsius (°C) is entered here.
>   Values between 0 – 60 are possible.
>   If value 0 (zero) is selected, the alarm is deactivated.
>   The standard value is '35'.

Diffenrence-limit degrees C per 5 days, *0…9.9:*
>   The desired difference alarm in degrees Celsius (°C) is entered here.
>   Values between 0.1 – 9.9 per 5 days are possible.
>   If value 0 (zero) is selected, the alarm is deactivated.
>   The standard value is '5' (5°C per 5 days, this means min. 1°C per day).

[Clear all bins of the selected ADT-D]
>   If necessary, existing bins registered in this ADT-D can be deleted before starting a new configuration.

[Clear the bins of all ADT-Ds]
>   Deletes all existing digital bins.

[Load Configuration of ADT-D, this may last up to 8 minutes/segment]
>   Configures all bins reported by the ADT-D, which can take up to 8 minutes per segment.

Result

Reports 'expiration time', 'timeout' or 'ok'. When this message appears, the configuration for the ADT-D selected above is complete.

[Leave to restart periodic data collecting!]

Closes the window and goes back online.

5.6.12. COM server

Inactive.
Refer to a separate manual for this menu item.

Info: Serves as remote control. Allows data transfer to a PC by network (LAN) instead of USB. Installations in other LANs can also be controlled via a VPN tunnel. This requires a COM server option and is not included in the standard scope of delivery. The COM server must be ordered separately.

5.6.13. Installation

Inactive.
Access to this checkbox is protected by a special password and is reserved solely for Agro-matic AG.

5.7. Help

The help menu shows the current situation of the detected bins. Which ones give an alarm, which do generate a measurement error, displays the battery status of the radio bins, etc.

SM2010S help

Bins Status-Colors and actual count

15	Measure present, no alarms
0	Measure present, differencealarm
0	Measure present, absolutealarm
0	Measure present, sensor fault
0	Last measure not received
0	Bins battery < 2.5 volts
0	Bins with Offset-alert 1
0	Bins with Offset-alert 2
1	Bins with inactive sensors
0	Inactive alarms

OK   more information

green, Measure present, no alarms
> Temperatures without alarms, everything ok.

yellow, Measure present, differencealarm
> Difference alarm, temperature(s) above difference limit value.

red, Measure present, absolute alarm
> Absolute alarm, temperature(s) above absolute limit.

pink, Measure present, sensor fault
> Sensor damaged or not correctly connected.

blue, last measure not received
> Communication problem, wait for next temperature scanning.

brown, bins battery < 2.5 volts
> Only for radio probes, change battery, contact Agromatic.

black, (field hidden) empty bins, (ADT-No. is 230)
> Registered but not recognized bins.

purple, bins with offset-alert 1
Number of bins exceeding the offset value 1.

purple, bins with offset-alert 2
Number of bins exceeding the offset value 2.

grey, bins with inactive sensors
It is possible to deactivate individual measuring points of a measuring cable or an entire group so that no alarm is triggered from these measuring points.
The number of these deactivated bins can be viewed here.

grey, inactive alarms
If individual measuring points outside the product exceed alarm limits, this has a negative effect on the overall picture. These measuring points, which make irrelevant measurements, can be deactivated. In order to nevertheless know whether such measuring points exist, the number of these bins is displayed here.

[OK]
Closes window Help.

[more information]
Opens the following window.
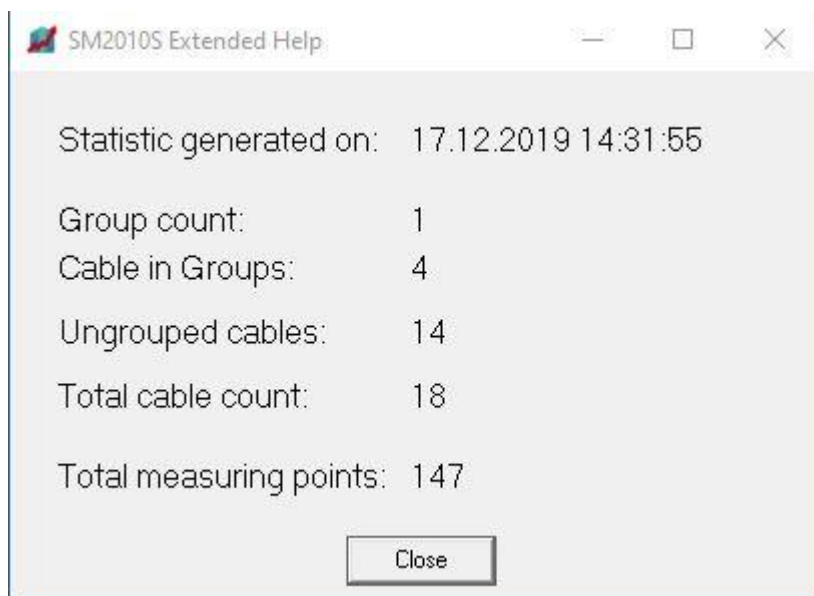
In this window, further information about the measuring system is given. An overview of all measuring cables, all measuring points and all groups.

[Close]
Closes this window and turns back to window «Help».

6. Optional functions
6.1. Level measurement
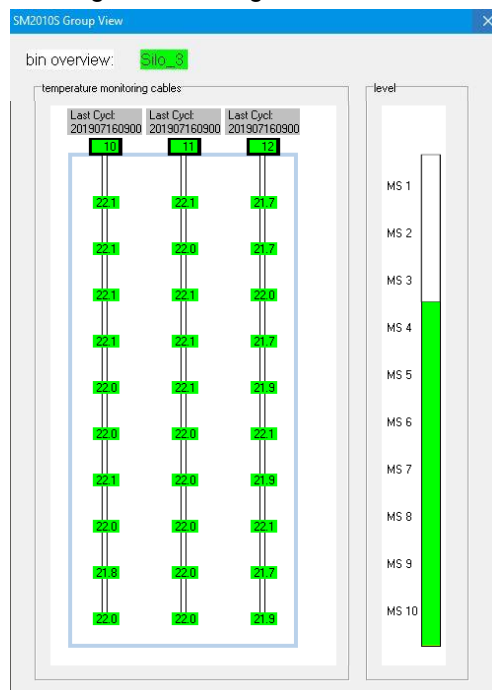
Article number: 1000037

If this function is activated, an extension of the window is displayed in the group view: the fill level. **One** measuring cable can be assigned to the selected group, which monitors and evaluates as a level indicator. This cable must be selected from the drop-down list «Cable for level sensing» in the «Group configuration» dialog. This requires measured values readily available for this cable.

The level of the silo is displayed here by a complicated measuring procedure if sufficient measured values are available.

Little data - no filling level   Enough data - filling level calculable
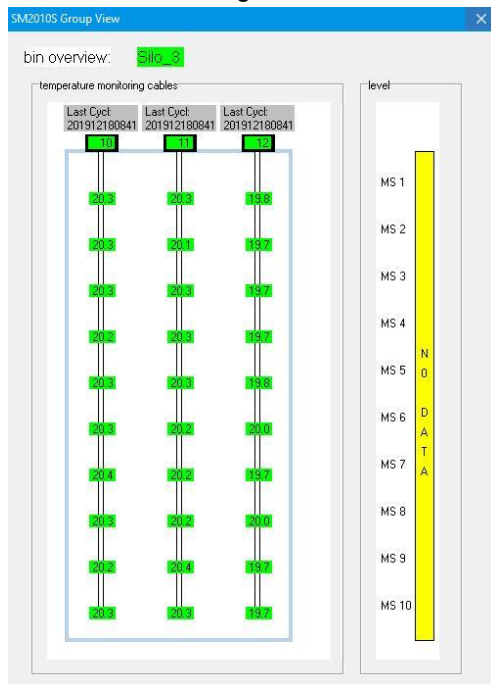
6.2. Deactivate alarms

Article number: 1000038

If this function is activated, an extension of the window is displayed in the group view. This function allows you to deactivate individual measuring points from top to bottom. Alarms at these deactivated measuring points are displayed and do not lead to any further action.
If measuring points are located outside the stored product, they react differently to temperature influences than those which are covered with material. These measuring points falsify the image and can therefore be switched off here.

Level setting for active alarms

1. Check box «deactivate alarms».
2. Move slider control.
   - The red bar indicates the selected position in the silo.
   - The measuring points above the red bar are highlighted in grey.
3. Deactivated, triggered alarm
4. Deactivated measuring point

In silo 1, various measuring points now indicate an absolute alarm. Because the alarms above the red bar are deactivated, Silo 1 as a whole (no. 5) does not display an alarm.
When the measuring cable is selected, the measuring points in the temperature profile are shown in the corresponding colour. By analogy shown on the bin overview, bins are displayed with grey background and alert icon.

The meaning of the individual alarm colours can be found in **Appendix B**.

6.3. COM server

Article number: 1040037

Instead of the USB interface, a network connection (LAN) can be implemented. This requires a COM server which must be integrated into the system (mechanically). In this case, the communication between SM2010S and Scanboxes is realized via a VCP (Virtual Com Port). A separate manual for COM server configurations is available. Special software is required for installation and configuration.

6.4. Alarm module

Article number: 1000019

It is possible to integrate an alarm module (AAM) in the existing system. This enables output of optical or acoustical alarms by means of an alarm light (art. 1000035). The alarm module has 8 relay outputs.

In chapter **5.7 Help** the status colours are explained and the currently available number of individual states is displayed. The colours for Ok, absolute and differential alarm also appear in the temperature profile display.

General: The relays are all switched on (activated) in error-free operation. In case of an error, they drop and indicate an alarm. This means that if the entire temperature monitoring system fails due to a power failure, all alarms are set.
The alarms are indicated collectively for all bins. This means that in case of an alarm, the faulty position must be checked via the Silo Manager SM2010S.

1	absolute alarm	Alarm output when the absolute limit value is exceeded. Every bin with at least one measuring point above the absolute limit value (default 35°C) triggers this alarm. Relay 1 drops down. The triggering occurs continuously after each current measurement. If an absolute alarm is already active and a new one is added, the relay is reset for 5s. This means that the relay switches on for 5s and then drops down again.
2	difference alarm	Alarm output when the differential limit value is exceeded. Each bin in which at least one measuring point fulfils the set criteria for a differential alarm (default 5°C) triggers a corresponding alarm (at least one measuring point exceeds the difference limit alarm converted to one day/5 days on 3 of the last 5 consecutive days). Relay 2 drops down. The triggering occurs after each reference measurement. If a differential alarm is already active and a new one is added, the relay is reset for 5s. This means that the relay switches on for 5s and then drops again.

3	Offset alert 1	Alarm output as soon as the limit value of the offset alert 1 is exceeded. Both the offset alarm 1 and 2 must be set together in the «Configuration/Limits» menu and activated setting the check mark. The offset alarm is displayed as 3 vertical lines (purple) for each measuring point in the "Temperature profile" window. 1st line = base value 2nd line = offset alert 1 3rd line = offset alert 2 If the value of at least one sensor is higher than the set offset alarm 1, relay 3 drops down. The update takes place after each measurement cycle. If an offset alert 1 is already active and a new one is added, the relay is reset for 5s. This means that the relay switches on for 5s and then drops down again.
4	Offset alert 2	Alarm output as soon as the limit value of the offset alert 2 is exceeded. Activation see above. If the value of at least one sensor is higher than the offset alert 2 set, relay 4 drops down. The update takes place after each measurement cycle. If an offset alert 2 is already active and a new one is added, the relay is reset for 5s. This means that the relay switches on for 5s and then drops down again.
5	communication alarm	Alarm output when measuring points are not detected. The communication alarm may have different causes. A communication alarm occurs when... A … the device is not properly connected or a fuse is damaged. B … the Silomanger SM2010S does not receive any data via the data interface. C … the Silomanger SM2010S cannot detect a temperature at a measuring point (sensor damaged). D … the Silomanger SM2010S cannot detect temperatures in a bin (measuring cable) (measuring cable damaged). In case of an error, relay 5 drops down. The communication alarm is triggered at each measurement cycle until it receives data again. If the communication alarm is active and a new measurement cycle begins and no data is received, the relay is reset for 5 seconds. This means that the relay switches on for 5s and then drops down again.

6	sensor error	Alarm output if sensor data are outside the sensor operating range. Sensor error is displayed if a sensor scanned by SM2010S is missing or values are beyond measurable range. Relay 6 drops down. The triggering occurs continuously after each current measurement. If a sensor error is already active and a new one is added, the relay is reset for 5s. This means that the relay switches on for 5s and then drops down again.
7	battery voltage	Alarm output when the battery voltage of a radio bin falls below the battery voltage. If the battery voltage drops below 2.5V in one or more radio bins, a low battery alarm is triggered. Relay 7 drops down. The triggering occurs continuously after each current measurement.
8	direct measurement	Alarm output when the absolute limit value is exceeded. If the "direct measuring bin" has one or more measuring points above the absolute limit value (default 35°C), it triggers an absolute alarm. Relay 8 drops down. The triggering occurs continuously after each direct measurement in one-minute intervals.

6.5. Data backup

Article number: 1010006

Agromatic offers a cyclic data backup of the measured data and the program configuration on an SD card.

6.6. Date Remote Control

Article number: 1040019

This is a software activation of the serial interface.

If the measured values are to be evaluated on other systems, a query via the serial interface RS232 to COM1 on the PC is possible.

The query also works on a USB port with an interface converter (article number: 1040041). The USB serial port must then be set on port COM1 in the Windows system settings.

Interface Properties:

-	Data transfer:	duplex operation
-		asynchron
-		without echo
-	Modem Control:	RTS, CTS, DCD static, DTR and DSR dynamic
-	Baudrate (Bit/sec):	2400
-	Bit:	7
-	Parity:	Even
-	Stoppbit:	1

Interface query:
format: :ZZZZZZ/MM

Description:
:   Start character (must be at the beginning of a query command)
ZZZZZZ   bin marking, maximal 6 characters
/   separator character
MM   number of sensor, max. 2 digits between 1 to 16
<CR>   final character, Carriage Return (ASCII 0D hex)

example:
:A130/9 +Enter   Query on measuring cable A130 for sensor 9
                          Terminate input string with enter.
answer: : 25.2 (temperature value in °C) <CR> <LF>
Format: :-xx.x <CR> <LF>

Error messages:
?ZELLE   Bin number (temperature measuring cable) unknown
?MSTEL   Sensor not defined
?ERROR   Temperature value out of measuring range

☞	If the communication is configured correctly, an answer will always be given.

7. System Messages

System messages are displayed at the bottom of the SM2010S main window (status bar). If an error occurs, the message is highlighted in red and starts with "F". If information is given, the message is highlighted in white and starts with "I". The current date and time are automatically appended to the message.

Error messages	Description
F ADT data bus: No USB-device	- No USB converter for the RS485 line was found. - The remote power supply is not connected, is switched off or does not have the correct ID. - There is a problem with the USB-Port (driver).
F ADT data bus: No COMx-device	The virtual ComPort x was not found, no connection to the ADTs.
F COM1 not ok!!	Serial line interrogation port via COM1 is configured, but could not be opened.
F ADT data bus: No license!	The SM2010S software does not match the temperature measuring system. No license from the manufacturer.
F License expired	Software license has expired.
F BCC error!	Last answer to an RS485 query had a wrong checksum. The answer is not displayed in the RS485 monitor.
F ADT data bus unreachable (directmeasurement canceled) ADT xy	Repeated query ended in timeout for the ADT with hex number xy. A possible direct measurement was interrupted. The ADT may be switched off, xy set incorrectly or the RS485 line may be damaged.
F ADT data bus unreachable (directmeasurement canceled) Netpoint xy	Repeated query ended in timeout for the radio net point with hex number xy. A possible direct measurement was interrupted. The net point may be switched off, xy set incorrectly or the RS485 line may be damaged.
F Attention, data collecting is stopped. Leave ….. to resume	Under Maintenance, SM2010S is set to "OFFLINE" for the following functions, i. e. no measurement data queries take place during this time: Initialize radiobins, test ADT, netpoint status, Configure digital bins, installation. Exit function in order to restart queries.
F Desired measurement not found!	The selected display has no measuring data.
F No more critical bins found!	There are no more bins with limit value exceeded.
F File …..csv not exported	Export failed.
F File SM2010N.cfg not ok, parameters not saved!	File error.
F USB-RS232 reload failed!	Initialization failed.

Informations	Description
I License ok	License has been reactivated.
I Messages of Netpoints, ADTs and Measurements [RS485], [COM1]	Opening message of SM2010S. "RS485" appears if the data line has been opened via RS485 from the PC. With virtual ComPort "ADT data bus via COMx" appears instead of „RS485". COM1 dito, if serial remote enquiry is configured and opened via RS232, COM1.
I ADT data bus repeated for ADT xy	ADT with hex number xy is queried for the second time after timeout.
I ADT data bus repeated for netpoint xy	Net point xy is queried for the second time after timeout.
I Start Radiosonde kann bis 30 Min dauern!	When starting direct measurement with wireless probes, it could take up to 30 minutes before the probe receives the command for measurements every minute. If the network point was not reachable, it could take up to 2 hours.
I Data collecting is active again	After leaving a special maintenance function, which set to "OFFLINE" SM2010S.
I Display of desired measurement	If a selected display function can display data.
I Bins select for printing: Click left choose, click right finished!	Instruction for graphical bin selection in the silo picture. Blue stands for selected, white stands for not selected (new left mouse click). Right mouse click finishes graphical selection and returns to print window.
I Bins select for printing finished	Message after right mouse click (see above).
I File …..csv exported	File *TAKTUELL.csv* or *TREFjjmmtt.csv* exported.
I License end date modified!	License end date modified.
I Retrieve bin	Message bin name for date inquiry.
I Retrieve end	Date inquiry completed.
I USB-RS232 reload!	Reinitialized USB after timeout.

Procedure in case of an error:
Repeat action which caused the error. Check complete system if unsuccessful. Check cabling of all elements. Check power supply. Test again.

In case of doubt contact Agromatic AG, Tel: +41 (0)55 256 21 00.

## 8.	Licence Conditions

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## 9.	Revision History

Dok-Version:	Dok-Name:	Erstellung:	Autor:
V2.3	E_BA_SM2010S_V2-3	11.2.2020	AD

Appendix A
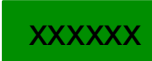
Meaning of the abbreviations and terms used (Glossary)
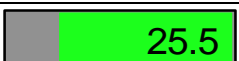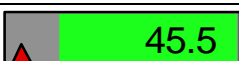
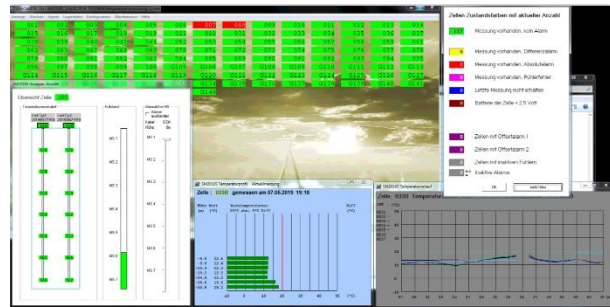|	
Silomanager:	The software SM2010S is called Silomanager and controls the complete temperature monitoring system.
Main window:	Window with silo plan and display of the bin positions.
Status bar:	Shown at the bottom of the main window. System messages are displayed here.
Bin:	Temperature measuring cable or designation of a group of measuring cables. A bin is actually a silo.
Group:	Group of temperature measuring cables (bins) in the same silo.
Measuring point:	Sensor in the temperature measuring cable
External bin name or bin designation:	Freely definable name for a temperature measuring cable, max. 6 chars
Cable-number:	Number of the temperature measuring cable (identification number)
ADSB:	analogue scanbox
ADT-number:	address of analog scanbox
ADT-D:	digital scanbox
ADT-D-number:	address of digital scanbox
ADT-F:	wireless access point (netpoint)
Netpoint-number:	address of wireless access point (netpoint)
AFS:	power supply of the entire temperature monitoring system
radio:	wireless communication
radio bin number:	number of a wireless probe (identification number)
AAM:	alarm module

Appendix B

Meaning of the colours in the different views

Symbols	Display in main window
10 **Silo_1**	These are bin names. This can be a single temperature measurement cable or a group of temperature measurement cables.
xxxxxx	For this bin everything is well, no errors. The measured values are all within all tolerances.
xxxxxx	This bin has no current measured values.
xxxxxx	Bin with sensor error
xxxxxx	Bin with absolute alarm
xxxxxx	Bin with difference alarm
xxxxxx	Bin with offset alarm
xxxxxx	Radio bin with battery low display
xxxxxx	If checkbox «Bin name/CableNr.» is checked unter «Maintenance/Edit bins table»: bins which are read-in but not measured by the system are displayed.
	Grey highlighting of bins: single measuring points are deactivated
xxxxxx	Bin with deactivated measuring points, no error
▲ xxxxxx	Bin with deactivated measuring points and absolute alarm
△ xxxxxx	Bin with deactivated measuring points and difference alarm
▲ xxxxxx	Bin with deactivated measuring points and offset alarm

XXXXXX	bin marked for printing in menu «print»
XXXXXX	bin marked for printing in menu «storage data»

Symbols	Measuring point display in group view
25.5	Measuring point without error, everything ok
XX.X	Measuring point without current measurement
XX.X	Measuring point with sensor error
45.5	Measuring point with absolute alarm
31.5	Measuring point with difference alarm
27.5	Measuring point with offset alarm
22.5	Measuring point with battery low display (only radio bins)
25.5	This measuring point is deactivated.
▲ 45.5	Deactivated measuring point with absolute alarm.
▲ 31.5	Deactivated measuring point with difference alarm.
▲ 27.5	Deactivated measuring point with offset alarm.

Temperature display in temperature profile	Description
	Deactivated measuring point
	Normal display, no alert
	Measuring point with absolute alarm
	Measuring point without current measurement
	Measuring point with difference alarm
	The actual measured value is higher than the reference value.
	The actual measured value is lower than the reference value.

The purple markers show the places where the values are for

- Offset base (left)
- Offset value 1 (middle)
- Offset value 2 (right)

For a reaction of this setting only the reference measurements are relevant.

	The offset alarms are activated. The actual temperature value is equal to the base value.
	The temperature value has exceeded the base value.
	The temperature value has exceeded the base value and the offset value 1. Offset alarm 1 is triggered.
	The temperature value has exceeded the base value, the offset value 1 and the offset value 2. Offset alarm 2 is triggered.
	The temperature is sinking. The actual measured value is lower than the base value. If the temperature continues to sink, the base is moved downwards.

**Technical Data
Software
SM2010S**

Article	Software SM2010S
Article number	**1000036**
Application purpose	PC software to monitor and record silo temperature values.
Scope of delivery	PC software SM2010S on USB stick
System requirements	
Operating system	Windows 7/10
USB	min. one USB interface type I or II
Main memory	min. 4GB RAM
Hard disk	min. 5GB HD
Processor	min. 1GHz
Functions	
Display	- group view - with graphic display of the measured temperature values (bar chart) - Temperature course over last 30 days - continuous recording of temperature measurements - various analysis possibilities of measured temperature values - display of cell numbers as table or with silo background image
Alarms	- absolute alarm - difference alarm - offset alarm 1 - offset alarm 2 Alarms can be set per cell or generally.
Data handling	- data export in csv and pdf format or printout (manually or cyclic printout programmable) - easy storage data management
Languages	German, English, French, Italian
Options	
Display	Controlling of filling level using the temperature difference measurement.
Alarms	Deactivation of alerting
Accessories	- Alarm module - Alarm light